

**DRAFT ECONOMIC ANALYSIS
OF CRITICAL HABITAT DESIGNATION
FOR THE PEIRSON'S MILK-VETCH**

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EXECUTIVE SUMMARY

1. The purpose of this report is to identify and analyze the potential economic impacts associated with the designation of critical habitat for the Peirson's milk-vetch (milk-vetch) (*Astragalus magdalenae* var. *peirsonii*). This report was prepared by Industrial Economics, Incorporated for the U.S. Fish and Wildlife Service (Service).
2. The milk-vetch is a short-lived perennial plant that occurs within the Algodones Dunes in southeastern California. In 1998 the milk-vetch was Federally listed by the Service as threatened due to threats of increasing habitat loss from off-highway vehicle use and associated recreational development, destruction of plants, and lack of protection afforded under State law. In August of 2003, the Service proposed to designate critical habitat for the milk-vetch within the Algodones Dunes.
3. Section 4(b)(2) of the Endangered Species Act (Act) requires the Service to designate critical habitat on the basis of the best scientific data available, after taking into consideration the economic impact, and any other relevant impact, of specifying any particular area as critical habitat. The Service may exclude areas from critical habitat designation when the benefits of exclusion outweigh the benefits of including the areas within critical habitat, provided the exclusion will not result in extinction of the species.
4. This analysis considers the potential economic effects of designating critical habitat for the milk-vetch. It also considers the economic effects of protective measures taken as a result of the listing of the milk-vetch as an endangered species, and other Federal, State, and local laws that aid habitat conservation in areas proposed for designation. Actions undertaken to meet the requirements of other Federal, State, and local laws may afford protection to the milk-vetch and its habitat, and thus contribute to the efficacy of critical habitat-related conservation and recovery efforts. Thus, the impacts of these actions are relevant for understanding the full impact of the proposed critical habitat designation.
5. This analysis considers both economic efficiency and distributional effects. In the case of habitat conservation, efficiency effects generally reflect the "opportunity costs" associated with the commitment of resources to comply with habitat protection measures (e.g., lost economic opportunities associated with restrictions on land use). This information can be used by decision-makers to assess changes in overall social welfare that may occur as a result of designation. This analysis also addresses how potential economic impacts are likely to be distributed, including an assessment of any local or regional impacts of habitat conservation and the potential effects of conservation activities on small entities and the energy industry. This information can be used by decision-makers to assess whether the effects of the designation might unduly burden a particular group or economic sector. Finally, this analysis looks retrospectively at costs that have been incurred since the date the species was listed and considers those costs that may occur after the designation is finalized.

Framework for the Analysis

6. The proposed critical habitat designation for the milk-vetch is almost entirely found within the Imperial Sand Dunes Recreation Area (ISDRA), which is managed by the Federal Bureau of Land Management (BLM). The proposed designation makes up approximately 32 percent of the ISDRA. BLM has divided the ISDRA into eight management areas (Mammoth Wash, North Algodones Wilderness Area, Gecko, Glamis, Dune Buggy Flats, Adaptive Management Area, Ogilby, Buttercup). Seven of the eight management areas contain portions of proposed critical habitat; one management area, Dune Buggy Flats, does not contain proposed critical habitat. The ISDRA is a popular destination for enthusiasts of off-highway motorized vehicle (OHV) recreation (e.g., dune buggies, all-terrain vehicles (ATVs)), and the activity most likely to effect the milk-vetch is OHV use. While the ISDRA offers opportunities for non-OHV recreation, such as hiking and horseback riding, historical use patterns indicate that these activities occur infrequently relative to OHV-based recreation (BLM, March 1, 2004). As such, the analysis focuses on economic impacts to OHV enthusiasts and OHV-related businesses.
7. This analysis first quantifies the impact of milk-vetch-related management actions undertaken prior to the designation of critical habitat, from the time of the listing to the final designation of critical habitat. These are referred to as past impacts. These past impacts include administrative and project modification costs borne by Federal agencies as well as the efficiency and distributional effects of OHV use restrictions. The analysis then considers future administrative and project modification costs and the range of impacts that could result from future milk-vetch-related management actions.
8. There is a great deal of uncertainty in estimating the impact of milk-vetch-related management on future OHV use of the ISDRA. Specifically, this analysis assumes that the outcome of future management decisions could range from no effects to complete closure of certain management areas. Alternatively, future consultations and other management actions could result in a limit on the number of OHV users allowed within a given management area. Given uncertainty in the outcome of future consultations and other management actions, this analysis provides estimates of the potential total economic contribution of each ISDRA management area and that portion of each management area proposed for designation. These total economic contribution estimates represent the upper bound of impacts that could result from closure of these areas to OHV use. Thus, this analysis considers:
 - The administrative and project modification costs borne by the Service and BLM associated with milk-vetch-related management activities. Administrative costs are costs associated with engaging in interagency consultation, including time spent attending meetings, preparing letters and biological assessments, and in the case of formal consultations, the development of a Biological Opinion by the Service.

Project modification costs are those associated with implementing species and habitat management efforts. Projects may be modified in response to conservation measures suggested by the Service during the consultation process in order to avoid or minimize impact to a species and/or its habitat. Moreover, any additional management or conservation actions undertaken to minimize impact to the milk-vetch are also quantified as project modification costs.

- Consumer surplus associated with OHV use opportunities in the ISDRA.¹ Estimates of the consumer surplus generated by visitation to the ISDRA requires information on the number of trips taken to this area and the value of each trip. Limited data are available on past and expected future use of the ISDRA by OHV enthusiasts; these data are used to predict the number of OHV trips to each management area and in the portions of each management area proposed for designation. Estimates of OHV user-day values are drawn from the published literature.²
- Regional economic contribution of OHV activities in the ISDRA. Regional economic contribution is measured using available data on the number of trips taken to the ISDRA by OHV enthusiasts (as used to estimate total consumer surplus), existing data on expenditures by visitors to the ISDRA, and a commonly applied input/output model (IMPLAN).
- Impacts on small businesses associated with expenditures by visitors to the ISDRA. Small business impact estimates are generated using visitor expenditure data (as used to estimate the regional economic contribution) as well as information on small businesses in the region.

9. To conduct the analysis, best available data are gathered from a variety of sources, including government agencies, public associations, and OHV-related groups. Specifically, data was gathered from the Service, the Bureau of Land Management, local governments, and groups representing OHV recreation interests including the American Sand Association, the Off-Road Business Association, and the ISDRA Technical Review Team.

¹ Consumer surplus values for a user day of recreation represent the maximum amount that users would be willing to pay above and beyond the current costs of the activity to participate in the activity. By participating in OHV use of the ISDRA, users are able to accrue consumer surplus. The total surplus provided to all users of the ISDRA is one measure of the economic value of this area, and thus one measure of the efficiency loss that might result from closure of the area to OHV use.

² While closures are potentially associated with cost savings to public agencies, local communities, and health and safety service providers, these cost savings are not monetized.

Types of Economic Impacts Related to Peirson's milk-vetch Conservation Activities

Economists measure economic impacts in terms of both efficiency effects and distributional effects. *Efficiency effects* describe net changes in national social welfare, based upon the idea that social welfare can be maximized by using resources in ways that yield the greatest benefits to society. *Distributional effects* are often expressed in terms of measures of "regional economic impact" (e.g., jobs, lost output). Both of these measures of economic impact are valid, and should be considered in assessing the impact of Peirson's milk-vetch conservation activities.

Economic efficiency effects generally reflect "*opportunity costs*" associated with the commitment of resources required to accomplish species and habitat conservation. In this analysis, efficiency effects are measured as administrative costs and project modification costs resulting from Peirson's milk-vetch conservation activities. For example, the costs incurred by a Federal action agency to consult with the Service under section 7 represent opportunity costs, because the time and effort of land management agency personnel would have been spent in an alternative activity but for Peirson's milk-vetch conservation activities.

This analysis also addresses *distributional effects*, including an assessment of regional impacts of Peirson's milk-vetch conservation activities on the Off-Highway vehicle recreation within the Algodones Dunes in southeastern California, and the potential effects of conservation activities on small entities and the energy industry. *Regional economic impacts* are measured in terms of shifts in employment, tax revenues, and local and regional economic output. *It is important to note that these are fundamentally different measures of economic impact than efficiency effects, and thus cannot be added to or compared with estimates of changes in economic efficiency.*

Past Impacts

10. Two significant conservation efforts undertaken within the ISDRA prior to designation of critical habitat afford protection to the milk-vetch and its habitat and have had an impact on the local and regional economy. The first conservation effort providing habitat protection occurred in 1994, prior to the listing of the milk-vetch. The second conservation effort occurred in 2000, subsequent to the listing of the species in 1998.
 - In 1994, the California Desert Protection Act designated the 26,202 acre North Algodones Dunes Wilderness Area to be managed by BLM as part of the National Wilderness Preservation System. The Wilderness Act of 1964 cites habitat characteristics as a key component for wilderness consideration. According to the Act, a wilderness area "contain(s) ecological, geological, or other features of

scientific, educational, scenic, or historical value.”³ To preserve the qualities of the North Algodones dunes, the area was closed to motorized vehicle use, but accessible by hiking and horseback riding (BLM, March 1, 2004). This closure had virtually no effect on OHV recreational visitation, as historically the North Algodones area had been classified under the 1980 California Desert Conservation Area Plan as a controlled area, with access generally limited to non-motorized means and as a wilderness study area (BLM, March 1, 2004). This 1994 wilderness designation did result in minimal project modification costs to BLM associated with patrolling wilderness boundaries to prevent the entry of motorized vehicles. These costs are quantified in this report and included in the summary of past and on-going efficiency effects presented in Exhibit ES-1.

- In 2000, a lawsuit was filed against BLM by the Center for Biological Diversity and other groups. These groups alleged that BLM was in violation of section 7 of the ESA by failing to enter into formal consultation with the Service on the effects of the adoption of the 1980 California Desert Conservation Area Plan on threatened and endangered species. This lawsuit resulted in three management actions: a temporary closure of 49,310 acres in the ISDRA, the development by BLM of a revised Recreational Activities Management Plan, and the initiation of formal section 7 consultation with the Service on BLM’s management of the ISDRA. The temporary closure included areas within the Adaptive Management Area, Mammoth Wash, Gecko, Glamis, Dune Buggy Flats, and Buttercup management areas to provide protection to the Milk-vetch. These closures will be lifted once the Recreational Activities Management Plan is implemented.

This lawsuit resulted in conservation efforts having three types of impacts. First, similar to the costs associated with the California Desert Protection Act, administrative and project modification costs are associated with implementing and enforcing the closures and engaging in section 7 consultation with the Service. Second, this action resulted in a reduction in OHV use in closed areas. The reduction in OHV opportunities resulted in economic efficiency (i.e., social welfare) losses associated with lost OHV-related trips. Third, reductions in expenditures in OHV-related industries as a result of fewer OHV opportunities imposed economic impacts on the regional economy (including small businesses). Both past and on-going efficiency effects and distributional impacts are quantified in this report and summarized in Exhibits ES-1 and ES-2.

11. Past economic efficiency impacts are comprised of three elements: (1) consumer surplus impacts resulting from the loss of OHV opportunities due to the temporary closure of some areas of the ISDRA associated with the 2000 BLM lawsuit, (2) administrative costs, and (3) project modification costs associated with the conservation efforts. Consumer

³ Wilderness Act of 1964, 16 U.S.C. §§ 1131-1136

surplus losses resulting from lost use opportunities are borne by visitors to the ISDRA.⁴ Administrative and project modification costs are borne by the Service and BLM. The present value economic efficiency impacts associated with past and on-going management efforts are approximately \$25 million for the time period 1998-2004, or about \$4.1 million per year. As Exhibit ES-1 shows, the bulk of these impacts are associated with reduced OHV opportunities.

Exhibit ES-1 PAST EFFICIENCY EFFECTS ASSOCIATED WITH LISTING AND OTHER PROTECTIVE MEASURES: 1998 - 2004 (Millions of Dollars, 7% Discount Rate)*			
Consumer Surplus (Reduced OHV opportunities) (2003 Dollars)	Administrative Costs	Project Modification Costs	TOTAL
\$20.37	\$1.08	\$3.14	\$24.59
Annualized (1998-2004):			\$4.10
*Efficiency effects are estimated using a discount rate of three percent in Appendix C of this report.			

12. Past regional impacts stem from a reduction in OHV-related expenditures due to the temporary closure of some areas of the ISDRA associated with the 2000 BLM lawsuit. The bulk of expenditures for OHV trips to the ISDRA, in terms of consumable goods, occurs in Imperial County, California, and Yuma County, Arizona (BLM, 2003b; ASA, 2003). These expenditures include groceries, supplies, services, OHV repair, fuel, and medical services. Approximately 85 percent of dune enthusiasts originate travel from California, while approximately 15 percent travel from Arizona (BLM, 2003b, 2003c). Within Imperial County, most recreational-related expenditures occur in El Centro and Brawley, the two largest cities in the county located adjacent to the dunes. Within Yuma County, most expenses are incurred in Yuma, the largest city in the county. (BLM, 2003c).⁵ Based on available information, this analysis concludes that 85 percent of the expenditures occur in Imperial County and 15 percent occur in Yuma County.

⁴ Visitation estimates reflect trips taken by OHV use parties (i.e., all individuals in a vehicle) to all management areas.

⁵ This analysis does not quantify the regional economic impact of OHV purchases. These purchases may occur in the user's county of residence; thus, including these expenditures would likely significantly overstate the contribution of OHV activity to the regional economy. However, this analysis does consider expenditures for parts and repairs that likely occur within the region.

13. The regional economic impact of past ISDRA closures is approximately \$13 million to \$26 million in Imperial and Yuma Counties (2003 dollars). This range reflects a range of assumed per-trip expenditures and applies 2004 expenditure estimates. Expenditures in previous years (and thus impacts), were slightly lower, as visitation to the ISDRA has grown over time. This regional impact is associated with employment ranging from 227 to 443 jobs and between \$0.86 million and \$1.72 in taxes in both counties. As Exhibit ES-2 shows, the bulk of these impacts have occurred in Imperial County.

Exhibit ES-2 ANNUAL REGIONAL ECONOMIC IMPACTS ASSOCIATED WITH PAST ISDRA CLOSURES* (millions of 2003 dollars)				
Category	Imperial County		Yuma County	
	Low	High	Low	High
Revenue	\$11.01	\$22.00	\$1.99	\$3.97
Employment (jobs)	227	443	42	84
Taxes	\$0.73	\$1.46	\$0.13	\$0.26
*Low and high impact estimates reflect two estimates of trip expenditures based on a number of sources: California Department of State Parks and Recreation, American Sand Association, and other OHV groups representing ISDRA recreation, including the Off-Road Business Association.				

Potential Future Impacts

14. In 2003, the Service issued a Biological Opinion on the management of the ISDRA and the Recreational Activities Management Plan (Management Plan). As a result of this Biological Opinion, the Service and BLM agreed that the BLM should re-initiate consultation with the Service regarding the Management Plan within four years of its implementation or sooner, if milk-vetch populations in any management areas are shown to be declining to a level specified in the Biological Opinion. While this Biological Opinion includes no specifications for opening, closing, or limiting acreage to OHV use, it leaves open the potential for management decisions regarding these areas. Thus, future economic impacts could result from the proposed critical habitat designation and the Management Plan.
15. This analysis assumes that the Management Plan will be implemented at the end of 2004. Following implementation of the Management Plan, the re-initiation of section 7 consultations will result in administrative costs. In addition, implementation of the Management Plan is likely to result in project modification costs. The potential future project modification costs reflect a variety of planned management actions associated with

the implementation of the Management Plan (e.g., biological monitoring, staffing). The present value administrative and project modification costs association with potential future impacts are approximately \$11.38 million for the time period 2005 to 2024, or about \$0.57 million per year (2003 dollars).⁶ As Exhibit ES-3 shows, the bulk of these costs are associated with project modification costs.

Exhibit ES-3 SUMMARY OF POTENTIAL FUTURE ADMINISTRATIVE AND PROJECT MODIFICATION COSTS 2005-2024 (Millions of Dollars, 7% Discount Rate)*		
Administrative Costs	Project Modification Costs	TOTAL
\$0.02	\$11.36	\$11.38
Annualized:		\$0.57
*Efficiency effects are estimated also using a discount rate of three percent in Appendix C of this report.		

16. Whether OHV access will be limited in the future within a given management area will depend on the outcome of future section 7 consultations and other management decisions. While future closures of management units are not anticipated to occur by either the Service or BLM, closure of management areas within the ISDRA to OHV use to protect the milk-vetch has occurred in the past. Thus, this analysis presents the economic efficiency and regional economic contributions of OHV use within each management area and within the proposed critical habitat designation portion of each management area. These estimates can help in understanding the potential economic impacts that might occur under a variety of management scenarios.⁷ Specifically, this report presents the economic contribution that each management area is forecast to provide in terms of OHV recreation in the absence of closures. These contribution estimates represent upper bound estimates of the economic impact that could occur if closure of those areas were to take place. These are upper bound impact estimates in that:

- It is not possible to forecast with certainty whether critical habitat designation would result in closures of portions of the ISDRA. To the extent that closures do not occur, these forecast impacts will not occur.

⁶ Efficiency effects are estimated using a discount rate of three percent in Appendix C of this report.

⁷ This analytic approach is similar to that used by the Service to estimate the contribution of National Wildlife refuges to regional economies and overall social welfare (e.g., ISER and IEc, 1998; IEc, 2000).

- It is not possible, using existing data, to predict the percentage of OHV users who visit areas of the ISDRA that are proposed for critical habitat. Lacking detailed user data, this analysis assumes that visitation within the ISDRA is evenly distributed within each management area. To the extent that areas proposed for designation are less popular with OHV users, this analysis could overstate impacts by overestimating the number of trips that could be affected by the designation. In fact, the Service has avoided designating many of the concentrated use areas in the ISDRA, in particular intensive OHV activity areas, including many major staging sites, campgrounds, and disturbed areas along roadways.
- It is not possible, using existing data, to model the OHV recreationist behavior in response to the closure of a portion of the ISDRA. To the extent that acceptable substitute sites are available to these users, and congestion effects do not result from redistribution of OHV use, this analysis may overstate the consumer surplus impact of any closures.

Thus, even if the designation were to result in closures, future impacts could be lower than those estimated in this report. The analysis does assume that administrative and project modification costs will result from the designation, whether or not closures occur.

17. The annualized consumer surplus contributions for OHV use in the proposed critical habitat designation and in the ISDRA are presented in Exhibit ES-4 for each management area. Economic contributions associated with those portions of each of the management areas range from \$0 (for that portion of the North Algodones Wilderness and Dune Buggy Flats management areas proposed for designation) to \$4.91 million per year (for that portion of the Glamis management area proposed for designation).
18. As noted above, these results can be used to understand the range of economic efficiency impact of a variety of closure scenarios.
 - No Closure Scenario: If no closures were to take place, the efficiency effects associated with future milk-vetch protection would be associated with administrative and project modification costs only (i.e., losses to OHV users would be zero). That is, annual impact estimates would be approximately \$0.6 million.⁸
 - Closure Scenario: If areas proposed for critical habitat designation within a management area were closed to OHV use, efficiency effects would be associated with administrative costs, project modification costs, and consumer surplus losses to OHV users. That is, efficiency effects would be the sum of the administrative and project modification costs (\$0.57 million) and the consumer surplus contribution associated with the affected region(s). For example, if the Ogilby management area

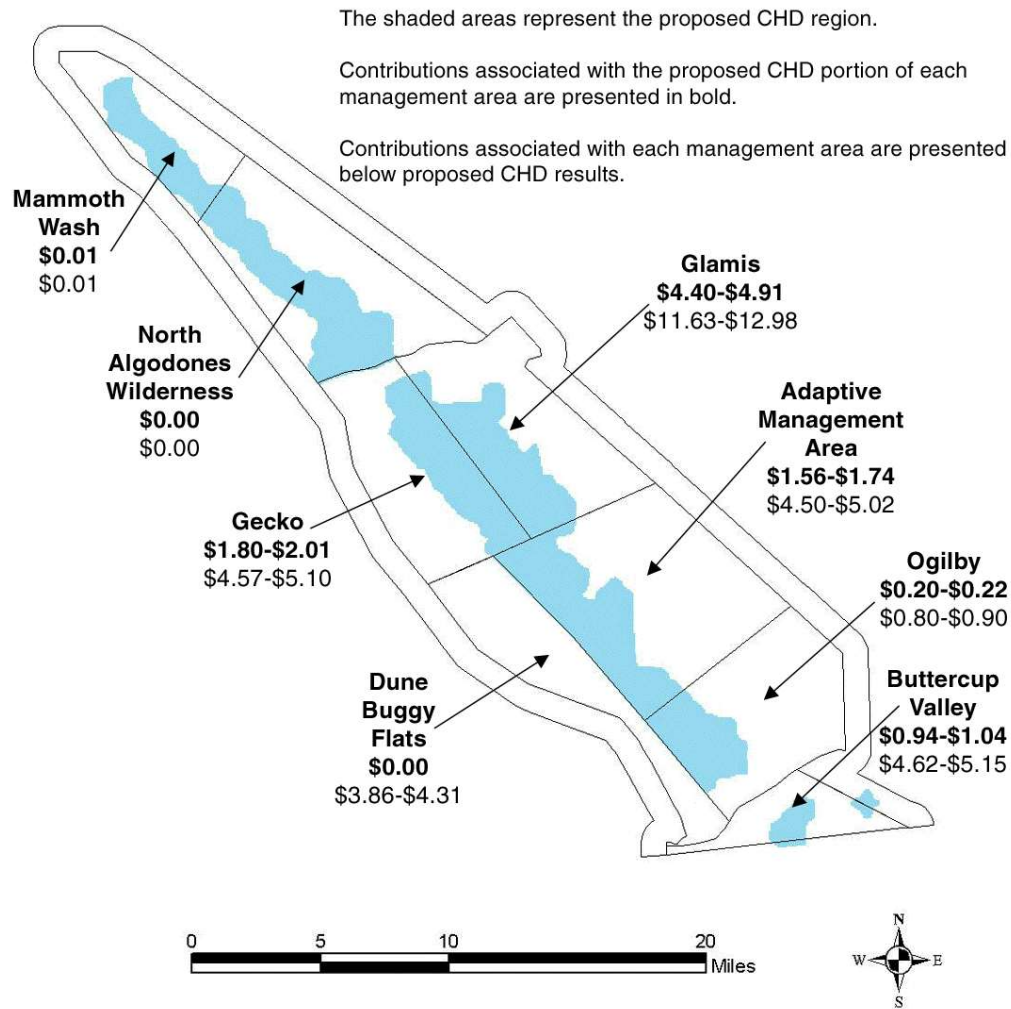
⁸ Administrative and project modification costs associated with the proposed CHD are expected to occur regardless of the decision associated with allowed activities in each management area.

were to be closed, the efficiency effects would range from \$0.77 million per year to \$0.79 million per year (\$0.57 million per year in administrative and project modification costs plus consumer surplus impacts ranging from \$0.2 million per year to \$0.22 million per year). If all of the areas proposed for designation within the ISDRA were closed to OHV use, the efficiency effects would range from \$9.5 million per year to \$10.5 million per year (\$0.57 million per year in administrative and project modification costs plus consumer surplus impacts ranging from \$8.9 million per year to \$9.9 million per year) (2003 dollars).

19. The regional economic contributions associated with OHV use within the proposed critical habitat designation and in the ISDRA are presented in Exhibit ES-6 for each management area. These results can also be used to understand the upper-bound regional impacts of a variety of closure scenarios. For example, as shown in Exhibit ES-6, if areas proposed for critical habitat designation within the Ogilby management area were closed to OHV use, the regional economy would see an upper bound reduction in output of \$1.23 million to \$2.75 million in year 2013 (2003 dollars).⁹ If no closures were to take place, the lower bound regional economic impact would be zero.
20. If all of the areas proposed for designation within the ISDRA were closed to OHV use, the regional economy would see an upper bound reduction in output of \$55 million to \$124 million in year 2013 (2003 dollars), and a potential loss in employment of 1,207 to 2,585 jobs. If no closures were to take place, the lower bound regional economic impact would be zero.

⁹ The reported range reflects uncertainty in average expenditures per user-day. Regional economic impacts for 2013 are reported in this example since visitation is expected to rise until that year, and then level off. Thus, the impacts associated with closures in other years would be smaller.

Exhibit ES-4
CONSUMER SURPLUS VALUE GENERATED THROUGH OHV-USE BY
MANAGEMENT AREA
Annualized Over the Time Period 2005 - 2024
(millions of 2003\$)



Notes:

1. In each management area, visitation associated with the proposed CHD portion is determined to be a percentage of the total visitation to that management area. These percentages are calculated as the ratio of acreage in the proposed CHD portion of each management area to the total acreage in that management area. To the extent that visitation is lower in the proposed CHD than the other portions of the ISDRA management areas, these are overestimates.
2. Upper and lower bound estimates reflect two visitation growth rate scenarios based on BLM analysis (BLM, 2003b).
3. Visitation estimates reflect trips taken by OHV use parties (i.e., all individuals in a vehicle) to the management area (BLM, 2003c).
4. The one-mile wide area around the ISDRA exists as a Planning Area Boundary and is not part of the ISDRA.

21. The economic baseline for Imperial and Yuma Counties provides a basis of comparison for the result of the regional economic contributions. Output (i.e., industry revenue) for all industries in these two counties is approximately \$8.6 billion. Employment in these two counties is approximately 134,000. Estimates of the contribution of areas proposed for designation to output and to employment for each management area are presented in Exhibit ES-5.

Exhibit ES-5						
REGIONAL ECONOMIC OUTPUT AND EMPLOYMENT OF PROPOSED CHD AS PERCENT OF ECONOMIC STUDY AREA TOTALS						
Upper Bound Estimate*						
Management Area	OUTPUT			EMPLOYMENT		
	Imperial and Yuma County Output (millions)	Proposed CHD Output (millions)	Contribution of areas Proposed for Designation to Output	Imperial and Yuma County Employment	Employment	Percent of Total Imperial and Yuma County Employment
Adaptive Management Area	\$8,575.89	\$21.66	0.25%	133,908	453	0.34%
Buttercup		\$13.01	0.15%		272	0.20%
Dune Buggy Flats		\$0.00	0.00%		0	0.00%
Gecko		\$25.03	0.29%		523	0.39%
Glamis		\$61.11	0.71%		1,278	0.95%
Mammoth Wash		\$0.09	0.00%		2	0.00%
North Algodones Wilderness		\$0.00	0.00%		0	0.00%
Ogilby		\$2.75	0.03%		58	0.04%
Proposed CHD Total		\$123.65	1.44%		2,585	1.93%
Notes: * Upper bound estimates include high visitation estimates (5.0 percent per year, based on BLM analysis) and high expenditures per trip (\$515, based on information provided by the American Sand Association, BLM, and CA DPR). Source: IMPLAN 1998, and IEc analysis.						

22. Measures of economic efficiency are distinct from regional economic impact measures. As such, these two measures of impact cannot be directly compared and should not be summed.
23. It is not possible, using existing data, to model the OHV user behavior in response to particular management scenarios for portions of the ISDRA. However, using information on past behavior in response to closures indicates that overall impacts could be less than the contributions reported for each management area. In particular, this report indicates that, using assumptions based on past behavior, impacts of a closure could reflect half of the total economic contribution that OHV activity provides in the proposed critical habitat portions for each of the management areas. This analysis and detailed results are reported in section 4 of this report.

Understanding the Regional Economic Contribution of OHV Trips to the ISDRA

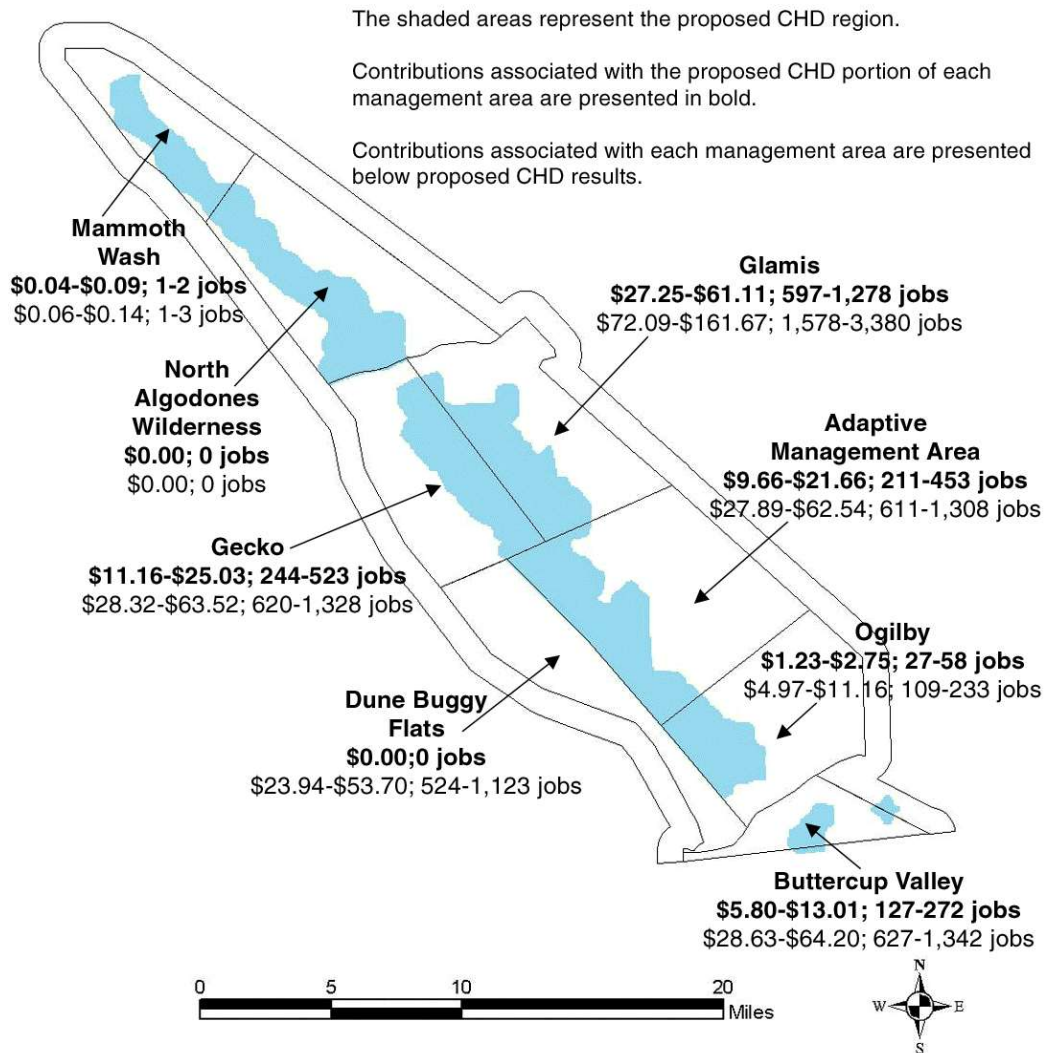
Economists use a variety of measures of economic activity to describe the contribution of an industry to the regional economy. This analysis considers a range of such measures. These include direct expenditures by OHV recreators, the resultant output of various businesses who sell goods and services to these recreators and to each other, and the number of jobs and government tax revenues associated with this level of output. For example:

- This analysis estimates that 162,271 trips were taken by OHV recreationists to the Glamis management unit in 2003.
- On average, these recreators spend approximately \$390 per trip, or a total of about \$63 million in the economies of Yuma and Imperial counties together.¹⁰ As 85 percent of trip-related expenditures are estimated to occur within Imperial County, recreators spend approximately \$54 million in Imperial County and \$9 million in Yuma County.
- These expenditures generate indirect and induced impacts to the regions' economies, with a total impact of about \$75 million in Imperial County and \$14 in Yuma County. That is, for every dollar spent by recreators, the economy sees an increase in output of \$1.40.
- The two-county contribution of \$88 million in output supports about 1,900 - 1,600 jobs in Imperial County and 300 jobs in Yuma County. This represents about \$33,000 in OHV user expenditures per job (i.e., \$63 million / 1,900 jobs).
- This level of output also generates about \$5.8 million in tax revenues for both counties, or about \$0.09 in tax revenue per dollar of OHV user expenditure.

While the absolute level of these estimates is large, these results should be considered in the context of the size of the economies of the two impacted counties. For example, the total taxable sales of all businesses located in Imperial County in 2002 was \$1.5 billion, and the total number of jobs in 2002 was 55,300. In addition, the total taxable sales of all business located in Yuma County in 2002 was \$1.7 billion, and the total number of jobs in 2002 was 65,728. Thus, direct expenditures associated with OHV trips to the Glamis management unit represents 3.7 percent of total sales and 2.9 percent of total jobs in Imperial County and 0.6 percent of total sales and 0.4 percent of total jobs in Yuma County.

¹⁰ \$390 is the midpoint of the high and low expenditures per trip estimates used in this economic analysis.

Exhibit ES-6
REGIONAL ECONOMIC CONTRIBUTION FROM OHV-USE BY
MANAGEMENT AREA, YEAR 2013*
(millions of 2003\$)



Notes:

1. In each management area, visitation associated with the proposed CHD portion is determined to be a percentage of the total visitation to that management area. These percentages are calculated as the ratio of acreage in the proposed CHD portion of each management area to the total acreage in that management area. To the extent that visitation is lower in the proposed CHD than the other portions of the ISDRA management areas, these are overestimates.
2. Upper and lower bound estimates reflect two visitation growth rate scenarios based on BLM analysis (BLM, 2003b), and two estimates of trip expenditures based on a number of sources: California

Small Business Impacts

24. This report presents an analysis of potential impact to small businesses. Using data gathered from the U.S. Census Bureau and Dun and Bradstreet on OHV-related small businesses in Imperial and Yuma Counties, this analysis concludes that it is unlikely that the impacts presented in this report would have a significant effect on small businesses at the national or county level. However, to the extent that changes in OHV-related expenditures are concentrated in specific geographic locations (e.g., Brawley (CA), El Centro (CA), Yuma (AZ)), any change in user access to the ISDRA could have a significant impact on area small businesses.
25. The analysis focuses on the major categories of OHV-related expenditures. In particular, between 80 and 85 percent of all OHV-related expenditures are made in two categories: (1) groceries, food and drinks; and (2) OHV equipment, supplies and services. Based on existing information, this analysis assumes that the majority of these expenditures in Imperial County (California) and Yuma County (Arizona) are made at small businesses (ORBA, 2003; Brawley Chamber of Commerce, 2003).

Energy Industry Impacts

26. Pursuant to Executive order No. 13211, Federal agencies are required to submit a summary of the potential effects of regulatory actions on the supply, distribution and use of energy. Two criteria are relevant to this analysis: 1) reductions in electricity production in excess of 1 billion kilowatt-hours per year or in excess of 500 megawatts of installed capacity and 2) increases in the cost of energy production in excess of one percent.
27. This proposed critical habitat designation is not expected to have any impacts on the energy industry. As noted by BLM, the likelihood of any energy-related activity occurring within the proposed CHD is minimal for a number of reasons. First, utility corridors exist outside of the proposed CHD area (BLM, December 2, 2003). Second, areas likely to experience development have been excluded from the proposed designation. Third, these activities likely would be discouraged by BLM in the proposed critical habitat areas as potentially interfering with the recreational function of the ISDRA. Fourth, the construction and maintenance of projects (such as utility lines) away from current roads, canals, and railways and through the central, more remote portions of the dunes is likely to be economically infeasible (BLM, December 2, 2003).

Caveats to Economic Analysis

28. Exhibit ES-7 presents the key assumptions of this economic analysis, as well as the potential direction and relative scale of bias introduced by the assumption.

Exhibit ES-7

CAVEATS TO THE ECONOMIC ANALYSIS

Key Assumption	Effect on Impact Estimate
It is not possible to forecast with certainty whether critical habitat designation would result in closures of portions of the ISDRA. To the extent that closures do not occur, forecast impacts associated with lost OHV trips will not occur.	+
It is not possible, using existing data, to predict the percentage of OHV users who visit areas of the ISDRA that are proposed for critical habitat. Lacking detailed user data, this analysis assumes that visitation within the ISDRA is evenly distributed across each management area. To the extent that areas proposed for designation are less popular with OHV users, this analysis could overstate impacts by overestimating the number of trips that could be affected by the designation. In fact, the Service has avoided designating many of the concentrated use areas in the ISDRA, in particular intensive OHV activity areas.	+
It is not possible, using existing data, to model OHV recreationist behavior in response to the closure of one or more management areas within the ISDRA. To the extent that acceptable substitute sites are available to users, the consumer surplus results may be overstated.	+
The IMPLAN model that is used to estimate regional economic impacts is a static model and does not account for the fact that the economy will adjust. IMPLAN measures the effects of a specific policy change at one point in time. Over the long-run, the economic losses predicted by the model may be overstated as adjustments such as re-employment of displaced employees occurs.	+
The analysis does not account for other activities that might be taking place in the ISDRA closure areas to mitigate the consumer surplus impact. For example, BLM lawsuit closures may have resulted in additional non-vehicular use of the areas. Individuals may have chosen to participate in a variety of activities, such as hiking, camping, and scenic vista viewing, thus potentially resulting in increased consumer surplus and regional economic impacts associated with these activities.	+
This analysis assumes that visitation within the Adaptive Management Area will increase by 15 percent of total ISDRA trips in 2005. To the extent that this visitation rebound occurs over a period of time, the early-year (e.g., 2005, 2006, 2007, etc.) visitation estimates for the Adaptive Management Area may be slightly overstated.	+
This economic analysis does not provide estimates of economic impacts that could occur to activities other than OHV use. Although not likely to be a significant threat to the PMV, limitations on other activities (e.g., hiking, horseback riding) could lead to additional impacts.	-
This analysis applies per-person consumer surplus estimates and per-party OHV trips estimates to generate consumer surplus losses and contributions.	-
This economic analysis relies on BLM estimates of projected visitation to the ISDRA up to year 2013. In the absence of visitation projections beyond that date, this analysis holds visitation constant at 2013 levels into the future. If the demand for OHV visits were to continue to rise beyond 2013, this assumption would understate the present value impact of closures.	-

Exhibit ES-7	
CAVEATS TO THE ECONOMIC ANALYSIS (continued)	
The analysis utilizes the best available existing data (i.e., no primary research).	+/-
The IMPLAN model that is used to estimate regional economic impacts relies on 1998 data. If significant changes have occurred in the structure of Imperial and Yuma Counties economy, our results may be sensitive to this assumption. The direction of any bias is unknown.	+/-
- : This assumption may result in an underestimate of real costs. + : This assumption may result in an overestimate of real costs. +/- : This assumption has an unknown effect on estimates.	

29. The above caveats describe factors that may introduce bias into the results of the analysis. The Service therefore solicits, from the public, further information on any of the issues presented above
30. This report contains four chapters. Chapter 1 presents the analytic framework of the analysis, including a discussion of the types of economic impacts that are estimated, the time frame of the analysis, and a summary of the analytic steps comprising the analysis. Chapter 2 provides background on the designation, the ecology of the area, and activities in the area, including a discussion of whether these activities are likely to involve interaction with the milk-vetch. Chapter 3 summarizes the key economic and demographic information for the counties likely to be impacted by the proposed critical habitat designation, including population characteristics and general economic activity. Chapter 4 presents the economic impacts of actions taken to protect the Peirson's milk-vetch. In particular, it provides past impacts, potential future impacts, small business impacts, and potential energy industry impacts. Finally, Appendix A provides the regulatory background for Peirson's milk-vetch protection efforts, and Appendix B presents the detailed analysis results.

31. The purpose of this analysis is to estimate the economic impact of actions taken to protect the Federally listed Peirson's Milk-vetch (PMV) and its habitat. It attempts to quantify the economic effects of the designation of critical habitat, as well as any protective measures taken as a result of the listing or other Federal, State, and local laws that aid habitat conservation in the areas proposed for designation. It looks retrospectively at costs that have been incurred since the date the species was listed, and it attempts to predict future costs likely to occur after the designation is finalized.
32. This information is intended to assist the Secretary in determining whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation.¹¹ In addition, this information allows the Service to address the requirements of Executive Orders 12866 and 13211, and the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA).¹² This report also complies with direction from the U.S. 10th Circuit Court of Appeals that, when deciding which areas to designate as critical habitat, the economic analysis informing that decision should include "co-extensive" effects.¹³
33. This chapter provides the framework for this analysis. The first section describes the general analytic approach to estimating economic effects. This section includes a discussion of both efficiency and distributional effects. The second section discusses the scope of the analysis, including a discussion of the link between existing and critical habitat-related protection efforts and economic impacts. The third section presents the analytic time frame used in the report. Finally, the fourth section describes the information sources used to conduct the analysis.

¹¹ 16 U.S.C. §1533(b)(2).

¹² Executive Order 12866, "Regulatory Planning and Review," September 30, 1993; Executive Order 13211, "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use," May 18, 2001; 5 U.S.C. §§601 *et seq*; and Pub Law No. 104-121.

¹³ In 2001, the U.S. 10th Circuit Court of Appeals instructed the Service to conduct a full analysis of all of the economic impacts of proposed CHD, regardless of whether those impacts are attributable co-extensively to other causes (*New Mexico Cattle Growers Ass'n v. U.S.F.W.S.*, 248 F.3d 1277 (10th Cir. 2001)).

1.1 Approach to Estimating Economic Effects

34. This economic analysis considers both the economic efficiency and distributional effects that may result from species and habitat protection. Economic efficiency effects generally reflect “opportunity costs” associated with the commitment of resources required to accomplish species and habitat conservation. For example, if activities that can take place on a parcel of private land are limited as a result of the designation or the presence of the species, and thus the market value of the land is reduced, this reduction in value represents one measure of opportunity cost or change in economic efficiency. Similarly, the costs incurred by a Federal action agency to consult with the Service under section 7 represent opportunity costs of habitat conservation.
35. This analysis also addresses how the impacts of the designation are distributed, including an assessment of any local or regional impacts of habitat conservation and the potential effects of conservation activities on small entities, the energy industry, or governments. This information can be used by decision-makers to assess whether the effects of the designation might unduly burden a particular group or economic sector.
36. For example, while habitat conservation activities may have a relatively small impact when measured in terms of changes in national economic efficiency, individuals employed in a particular sector of the economy in the geographic area of the designation may experience relatively greater impacts. The difference between economic efficiency effects and distributional effects, as well as their application in this analysis, are discussed in greater detail below.

1.1.1 Efficiency Effects

37. At the guidance of the Office of Management and Budget (OMB) and in compliance with Executive Order 12866 “Regulatory Planning and Review,” Federal agencies measure changes in economic efficiency in order to understand how society, as a whole, will be affected by a regulatory action.¹⁴ In the context of regulations that protect PMV habitat, these efficiency effects represent the opportunity cost of resources used or benefits foregone by society as a result of the regulations. Economists generally characterize opportunity costs in terms of changes in producer and consumer surpluses in affected markets.¹⁵
38. In some instances, compliance costs may provide a reasonable approximation for the efficiency effects associated with a regulatory action. For example, a landowner or manager may enter into a consultation with the Service to ensure that a particular activity will not

¹⁴ Executive Order 12866, “Regulatory Planning and Review,” September 30, 1993; U.S. Office of Management and Budget, “Circular A-4,” September 17, 2003, available at <http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf>.

¹⁵ For additional information on the definition of “surplus” and an explanation of consumer and producer surplus in the context of regulatory analysis, see Gramlich, Edward M., *A Guide to Benefit-Cost Analysis* (2nd Ed.), Prospect Heights, Illinois: Waveland Press, Inc., 1990; and U.S. 240-R-00-003, September 2000, available at <http://yosemite.epa.gov/ee/epa/eed.nsf/webpages/Guidelines.html>.

adversely modify critical habitat. The effort required for the consultation represents an economic opportunity cost, because the landowner or manager's time and effort would have been spent in an alternative activity had the parcel not been included in the designation. When compliance activity is not expected to significantly affect markets – that is, not result in a shift in the quantity of a good or service provided at a given price, or in the quantity of a good or service demanded given a change in price – the measurement of compliance costs can provide a reasonable estimate of the change in economic efficiency.

39. Where habitat protection measures are expected to significantly impact a market, it may be necessary to estimate changes in producer and consumer surpluses. For example, a designation that precludes the development of large areas of land may shift the price and quantity of housing supplied in a region. In this case, changes in economic efficiency (i.e., social welfare) can be measured by considering changes in producer and consumer surplus in the real estate market.
40. This analysis begins by measuring costs associated with measures taken to protect species and habitat. As noted above, in some cases, compliance costs can provide a reasonable estimate of changes in economic efficiency. However, if the cost of conservation measures is expected to significantly impact markets, the analysis will consider potential changes in consumer and/or producer surplus in affected markets.

1.1.2 Distributional and Regional Economic Effects

41. Measurements of changes in economic efficiency focus on the net impact of conservation activities, without consideration of how certain economic sectors or groups of people are affected. Thus, a discussion of efficiency effects alone may miss important distributional considerations. OMB encourages Federal agencies to consider distributional effects separately from efficiency effects.¹⁶ This analysis considers several types of distributional effects, including impacts on small entities; impacts on energy supply, distribution, and use; and regional economic impacts. It is important to note that these are fundamentally different measures of economic impact than efficiency effects, and thus cannot be added to or compared with estimates of changes in economic efficiency.

Impacts on Small Entities and Energy Supply, Distribution, and Use

42. This analysis considers how small entities, including small businesses, organizations, and governments, as defined by the RFA, might be affected by proposed critical habitat designation (CHD).¹⁷ In addition, in response to Executive Order 13211 "Actions

¹⁶ U.S. Office of Management and Budget, "Circular A-4," September 17, 2003, available at <http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf>.

¹⁷ 5 U.S.C. § 601 *et seq.*

Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use,” this analysis considers the impacts of critical habitat on the energy industry and its customers.¹⁸

Regional Economic Effects

43. Regional economic impact analysis can provide an assessment of the potential localized effects of conservation measures. Specifically, regional economic impact analysis produces a quantitative estimate of the potential magnitude of the initial change in the regional economy resulting from a regulatory action. Regional economic impacts are commonly measured using regional input/output models. These models rely on multipliers that mathematically represent the relationship between a change in one sector of the economy (e.g., expenditures by recreationists) and the effect of that change on economic output, income, or employment in other local industries (e.g., suppliers of goods and services to recreationists). These economic data provide a quantitative estimate of the magnitude of shifts of jobs and revenues in the local economy.
44. The use of regional input/output models in an analysis of the impacts of species and habitat conservation efforts can overstate the long-term impacts of a regulatory change. Most importantly, these models provide a static view of the economy of a region. That is, they measure the initial impact of a regulatory change on an economy but do not consider long-term adjustments that the economy will make in response to this change. For example, these models provide estimates of the number of jobs lost as a result of a regulatory change, but do not consider re-employment of these individuals over time or other adaptive responses by impacted businesses. In addition, the flow of goods and services across the regional boundaries defined in the model may change as a result of the regulation, compensating for a potential decrease in economic activity within the region.
45. Despite these and other limitations, in certain circumstances regional economic impact analysis may provide useful information about the scale and scope of localized impacts. It is important to remember that measures of regional economic effects generally reflect shifts in resource use rather than efficiency losses. Thus, these types of distributional effects are reported separately from efficiency effects (i.e., not summed). In addition, measures of regional economic impact cannot be compared with estimates of efficiency effects, but should be considered as distinct measures of impact.
46. Measures of economic efficiency are entirely distinct from regional economic impact measures. As such, these two measures of impact cannot be directly compared and should not be summed. In particular, these two different measures represent two different perspectives on the impact of any particular management scenario. The economic efficiency measures indicate net changes in overall social welfare that may occur as a result of designation. By taking this perspective, decision-makers ensure that the proposed CHD

¹⁸ Executive Order 13211, “Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use,” May 18, 2001.

resources are managed in the larger public interest, as opposed to the more specialized economic interests of a single company, industry or local community. The changes in output, employment, and tax revenue (i.e., regional economic impacts) therefore have no direct relevance in an analysis of overall social welfare. Nonetheless, decision-makers involved in designating critical habitat may be interested in local economic effects, making it important for the Service and others to understand the fundamental elements of such analyses.

1.2 Scope of the Analysis

47. This analysis attempts to quantify economic effects of the designation of critical habitat, as well as any protective measures taken as a result of the listing or other Federal, State, and local laws that aid habitat conservation in the areas proposed for designation. Habitat protection efforts undertaken to meet the requirements of other Federal, state, or local agencies can assist the Service in achieving its goals as set out in the Act. In certain cases, other government entities may work cooperatively with the Service to address natural resource management issues, thereby expediting the regulatory process for project proponents. Because efforts to protect the PMV likely contribute to the efficacy of the proposed CHD, this analysis estimates the impacts of these efforts. These actions are considered relevant for understanding the full impact of proposed CHD.

1.2.1 Sections of the Act Relevant to Analysis of Critical Habitat Designation

48. The analysis begins by looking retrospectively at the costs incurred since the time that the PMV was first listed. It focuses on activities that are influenced by the Service through sections 4, 7, 9, and 10 of the Act. It then looks at activities likely to occur in the foreseeable future, and quantifies the effects that sections 4, 7, 9, and 10 of the Act may have on those activities.
49. Section 4 of the Act focuses on the listing and recovery of endangered and threatened species, as well as the designation of critical habitat. In this section, the Secretary is required to designate species as endangered or threatened “solely on the basis of the best available scientific and commercial data.”¹⁹ Under section 4(d), the Service writes regulations to provide for the conservation of threatened species. The implementation of these regulations may have economic impacts on resource managers, landowners, and other relevant parties. Impacts associated with section 4(d) are considered in this analysis.
50. The protections afforded to threatened and endangered species and their designated habitat are described in sections 7, 9, and 10 of the Act, and economic impacts resulting from these protections are the focus of this analysis:

¹⁹ 16 U.S.C. 1533.

- Section 7 of the Act requires Federal agencies to consult with the Service to ensure that any action authorized, funded, or carried out will not likely jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat. The administrative costs of these consultations, along with the costs of project modifications resulting from these consultations, represent compliance costs associated with the listing of the species and the designation of critical habitat.
- Section 9 defines the actions that are prohibited by the Act. In particular, it prohibits the “take” of endangered wildlife, where “take” means to “harass, harm, pursue, or collect, or to attempt to engage in any such conduct.”²⁰ The economic impacts associated with this section manifest themselves in sections 7 and 10.
- Under section 10(a)(1)(B) of the Act, a non-Federal entity (i.e., a landowner or local government) may develop a Habitat Conservation Plan (HCP) for an endangered animal species in order to meet the conditions for issuance of an incidental take permit in connection with the development and management of a property.²¹ The requirements posed by the HCP may have economic impacts associated with the goal of ensuring that the effects of incidental take are adequately minimized and mitigated. In the case of the PMV, HCPs are not an issue. The vast majority of land ownership for the proposed CHD area is Federally-owned, and Federal agencies do not develop HCPs. Federal entities obtain permission for incidental take through the section 7 consultation process.

1.2.2 Other Relevant Protection Efforts

51. The protection of listed species and habitat is not limited to the Act. Other Federal agencies, as well as state and local governments, may also seek to protect the natural resources under their jurisdiction.²² In addition, under certain circumstances, the designation of critical habitat may provide new information to a community about the sensitive ecological nature of a geographic region, potentially triggering additional economic impacts under other State or local laws. In cases where these costs would not have been triggered “but for” the designation of critical habitat, they are included in this economic analysis.

²⁰ 16 U.S.C. 1538 and 16 U.S.C. 1532.

²¹ U.S. Fish and Wildlife Service, “Endangered Species and Habitat Conservation Planning.” From: <http://endangered.fws.gov/hcp/>, as viewed on August 6, 2002. Sections 9 and 10 of the Act do not apply to plants.

²² For example, the Sikes Act Improvement Act (Sikes Act) of 1997 requires Department of Defense (DoD) military installations to develop Integrated Natural Resources Management Plans (INRMPs) that provide for the conservation, protection, and management of wildlife resources (16 U.S.C. §§ 670a - 670o). These plans must integrate natural resource management with the other activities, such as training exercises, taking place at the facility. Zoning laws in the State of Hawai‘i limit land uses in areas designated by the state as Conservation Districts. The purpose of a Conservation District in Hawai‘i is to conserve, protect, and preserve the state's natural resources through appropriate management in order to protect the long-term sustainability of natural resources (Hawaii Revised Statutes, § 183 C-3).

1.2.3 Additional Analytic Considerations

52. Previous economic impact analyses prepared to support critical habitat decisions have considered other types of economic impacts related to section 7 consultations, including time delay, regulatory uncertainty, and stigma impacts. This analysis considers these economic impacts and has determined that the PMV proposed CHD is unlikely to have significant economic impacts of this nature.
53. Time Delay and Regulatory Uncertainty Impacts: Time delays are costs due to project delays associated with the consultation process or compliance with other regulations. Regulatory uncertainty costs occur in anticipation of having to modify project parameters (e.g., retaining outside experts of legal counsel to better understand their responsibilities with regard to critical habitat).
54. While BLM is expected to consult with the Service on the Recreational Activities Management Plan (RAMP) in the future, the agency indicates that many projects occurring on their lands would not occur within the proposed CHD (e.g., commercial filming, roadway and utility work) (BLM, Knauf and Hamada, October 17, 2003). As a result, section 7 consultations are unlikely. Thus, this economic analysis does not consider the impacts of time delays or regulatory uncertainty.
55. Stigma Impacts: Changes to private property values associated with public attitudes about the limits and costs of critical habitat are known as “stigma” impacts. Private property represents less than two percent of the total proposed CHD. The majority of these properties are historical mining holdings, for which no attempt has been made to extract minerals. As a result, stigma impacts on private property values are not included in this analysis.

1.2.4 Benefits

56. The published economics literature has documented that real social welfare benefits can result from the conservation and recovery of endangered and threatened species. Such benefits have also been ascribed to preservation of open space and biodiversity, both of which are associated with species conservation. Likewise, regional economies and communities can benefit from the preservation of healthy populations of endangered and threatened species, and the habitat on which these species depend.
57. In Executive Order 12866, OMB directs Federal agencies to provide an assessment of costs and benefits of a proposed regulatory actions.²³ However, in its guidance for implementing Executive Order 12866, OMB acknowledges that often, it may not be feasible to monetize, or even quantify, the benefits of environmental regulations.²⁴ Where benefits

²³ Executive Order 12866, “Regulatory Planning and Review,” September 30, 1993.

²⁴ U.S. Office of Management and Budget, “Draft 2003 Report to Congress on the Costs and Benefits of Federal Regulations; Notice,” 68 *Federal Register* 5492, February 3, 2003; and U.S. Office of Management and Budget, “Appendix 4: Guidelines to Standardize Measure of Costs and Benefits and the Format of Accounting Statements,” in

cannot be quantified, OMB directs agencies to describe the benefits of a proposed regulation qualitatively. *Given the limitations associated with estimating the benefits of proposed CHD for the PMV, the Service believes that the benefits of proposed CHD are best expressed in biological terms that can be weighed against the expected cost impacts of the rulemaking.*

1.3 Analytic Time Frame

58. The analysis examines activities taking place both within and adjacent to the proposed designation. It estimates impacts based on activities that are “reasonably foreseeable,” including, but not limited to, activities that are currently authorized, permitted, or funded, or for which proposed plans are currently available to the public. Accordingly, the analysis bases estimates on activities that span the 1998 to 2024 time frame, beginning on the day of the listing of the PMV. Past impacts addressed include management actions occurring from 1998 to 2004, including the listing of the PMV, the 2000 temporary ISDRA closures, and the revision of BLM’s Recreation Area Management Plan. The analysis of future impacts addresses management actions likely to occur from 2005 to 2024. It is likely that the use of the lands proposed for critical habitat designation will not change over this time period. As a result, this analysis looks forward 20 years. BLM has managed these lands for recreational purposes since 1972 (BLM, 2003b). The land use has had only minimal changes since the 1970's, with a small increase in the number of campgrounds and retail stores in the area.

1.4 Information Sources

59. The primary sources of information for this report were communications with and data provided by personnel from the Service, BLM, State agencies, regional governments and organizations and groups representing off-highway vehicle interests within southern California and the ISDRA. Specifically, the analysis relies on data collected in communication with personnel from the following entities.
- U.S. Bureau of Land Management (BLM);
 - California State Parks Off-Highway Motor Vehicle Recreation Division;
 - American Sand Association (ASA);
 - Off Road Business Association (ORBA);
 - ISDRA Technical Review Team;
 - Imperial County Board of Supervisors;
 - Brawley Chamber of Commerce.

60. This analysis also relies upon publicly available documents including the ISDRA's 2003 Recreation Area Management Plan (RAMP) and the Environmental Impact Statement for the ISDRA RAMP (BLM, 2003b; BLM, 2003d). Publicly available data were also used to augment the analysis. Please refer to the reference section at the end of this document for a full list of sources of information relied upon.

61. The Service has proposed to designate critical habitat for the Federally threatened Peirson's milk-vetch (*Astragalus magdalenae* var. *peirsonii*), a perennial plant that occurs within the Algodones Dunes, a large sand dune system located in southeastern California. In particular, the species occurs in the Imperial Sand Dunes Recreation Area (ISDRA). This chapter provides background on the geography, ecology, and human-uses of the ISDRA, and, in particular, of the proposed CHD. The first section presents the designation itself, including a description of management areas and land ownership. The second section details the ecology of the area, noting the ecological uniqueness of the ISDRA and other protected species found in the ISDRA. The third section describes the activities that occur in the area. Specifically, this section discusses whether these activities are likely to involve interaction with the PMV.

2.1 Designation

62. The Service has proposed to designate approximately 52,780 acres (21,359 hectares) of critical habitat in Imperial County, California for the Peirson's milk-vetch (PMV). The PMV is a stout, short-lived perennial plant belonging to the Fabaceae (Legume) Family. PMV develop extremely long tap roots that penetrate deeply in the sand and anchor the plants in the shifting dunes. The plant produces purple flowers and inflated fruits containing large flattened black seeds. In addition to the Algodones Dunes, the plant was once reported in Borrego Valley in San Diego County, but has not been encountered there in years. Populations also exist in Mexico within northeastern Estado de Baja California and in the Gran Desierto of Sonora. (Service, 2003a)
63. Approximately 99 percent of the proposed critical habitat designation (CHD) for the species occurs within the Imperial Sand Dunes Recreation Area (ISDRA). The ISDRA consists of approximately 167,000 acres of federal, private, and state lands, just west of Arizona and north of Mexico (BLM, 2003b).²⁵ Approximately 52,432 acres of proposed

²⁵ BLM reports this figure in the 2003 "Final Environmental Impact Statement for the Imperial Sand Dunes Recreation Area Management Plan and Proposed Amendment to the California Desert Conservation Plan 1980", May 2003.

CHD occurs within the ISDRA, and approximately 348 acres occur outside of the ISDRA boundaries.

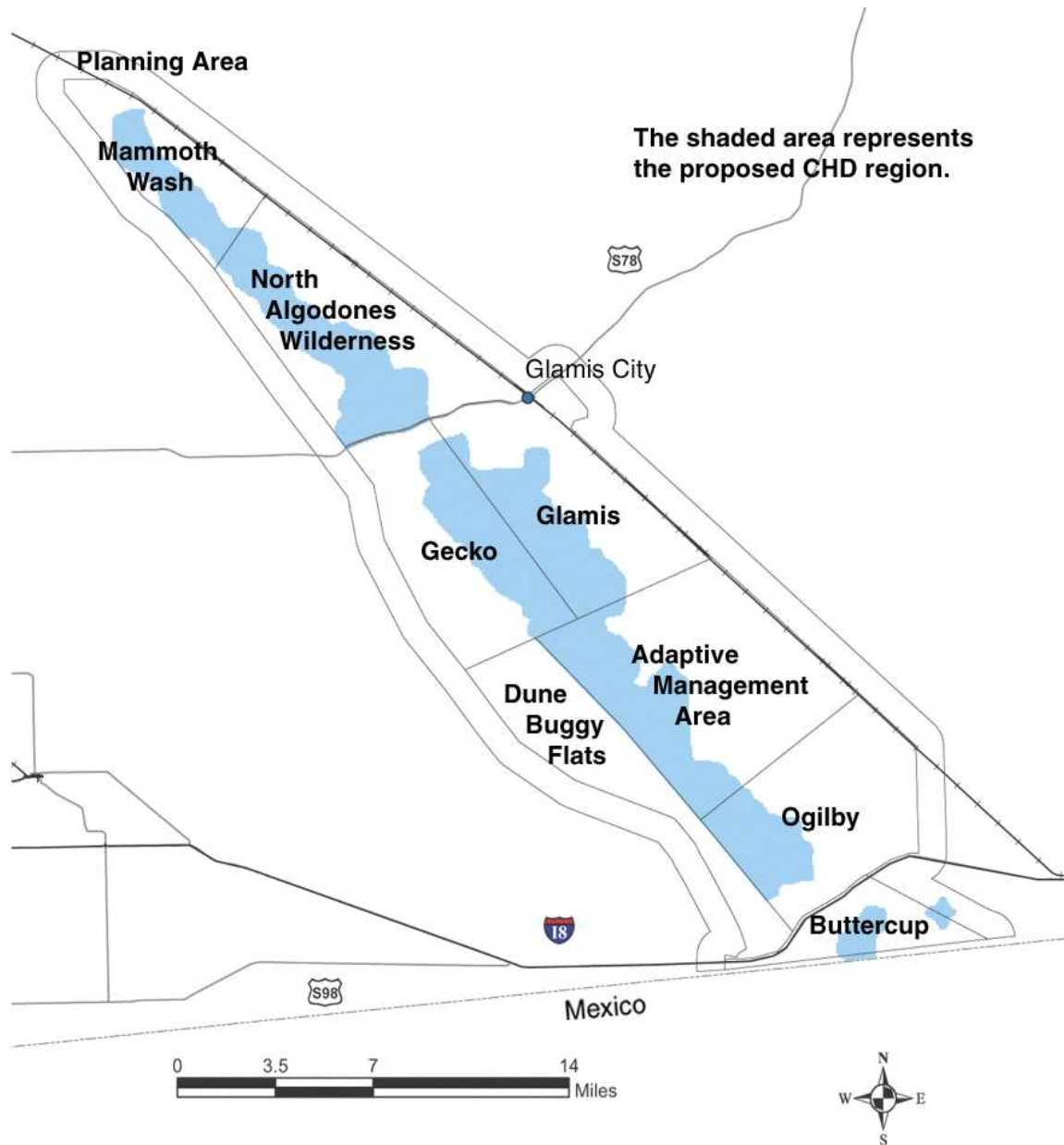
64. The Bureau of Land Management (BLM) manages approximately 159,072 acres of the ISDRA. In its 2003 Recreational Area Management Plan, BLM has proposed to manage the ISDRA based on eight individual management areas:

- Adaptive Management Area
- Buttercup
- Dune Buggy Flats
- Gecko
- Glamis
- Mammoth Wash
- North Algodones Wilderness
- Ogilby

65. In addition to the eight management areas, a one-mile wide area around the ISDRA exists as a Planning Area Boundary. This area is managed by BLM but is not considered part of the ISDRA.²⁶ Approximately 287 acres of this area are proposed for CHD. Moreover, 61 Federally-managed acres exist outside of the ISDRA, just south of the Buttercup management area boundary. Figure 2-1 provides a map of the ISDRA divided into the eight management areas as well as the boundaries of the proposed CHD. As shown in the figure, portions of proposed CHD near Buttercup are located outside of the ISDRA boundaries. Exhibit 2-1 provides information on the relative size of each management area and presents the number of acres of proposed CHD contained in each area. The Adaptive Management Area is the largest management area, representing 21 percent of the ISDRA. Gecko, Glamis, Dune Buggy Flats, North Algodones Wilderness, and Ogilby each represent between 10 and 17 percent of ISDRA lands. Buttercup and Mammoth Wash each represent approximately five percent of ISDRA lands.

²⁶ According to BLM, the purpose of the Planning Area Boundary is to reduce the impacts on surrounding properties from activities that occur within the ISDRA. BLM will permit camping in this area as well as travel on designated routes. The Planning Area Boundary is managed by BLM's Northeastern Colorado Desert and the Western Colorado Desert Route of Travel Plans (BLM, 2003d).

**FIGURE 2-1
MANAGEMENT AREAS OF THE ISDRA**



Notes:

1. The one-mile wide area around the ISDRA exists as a Planning Area Boundary and is not part of the ISDRA.
2. Sources: US Fish and Wildlife Service, GIS files of proposed CHD; BLM, GIS files of ISDRA by Management Area.

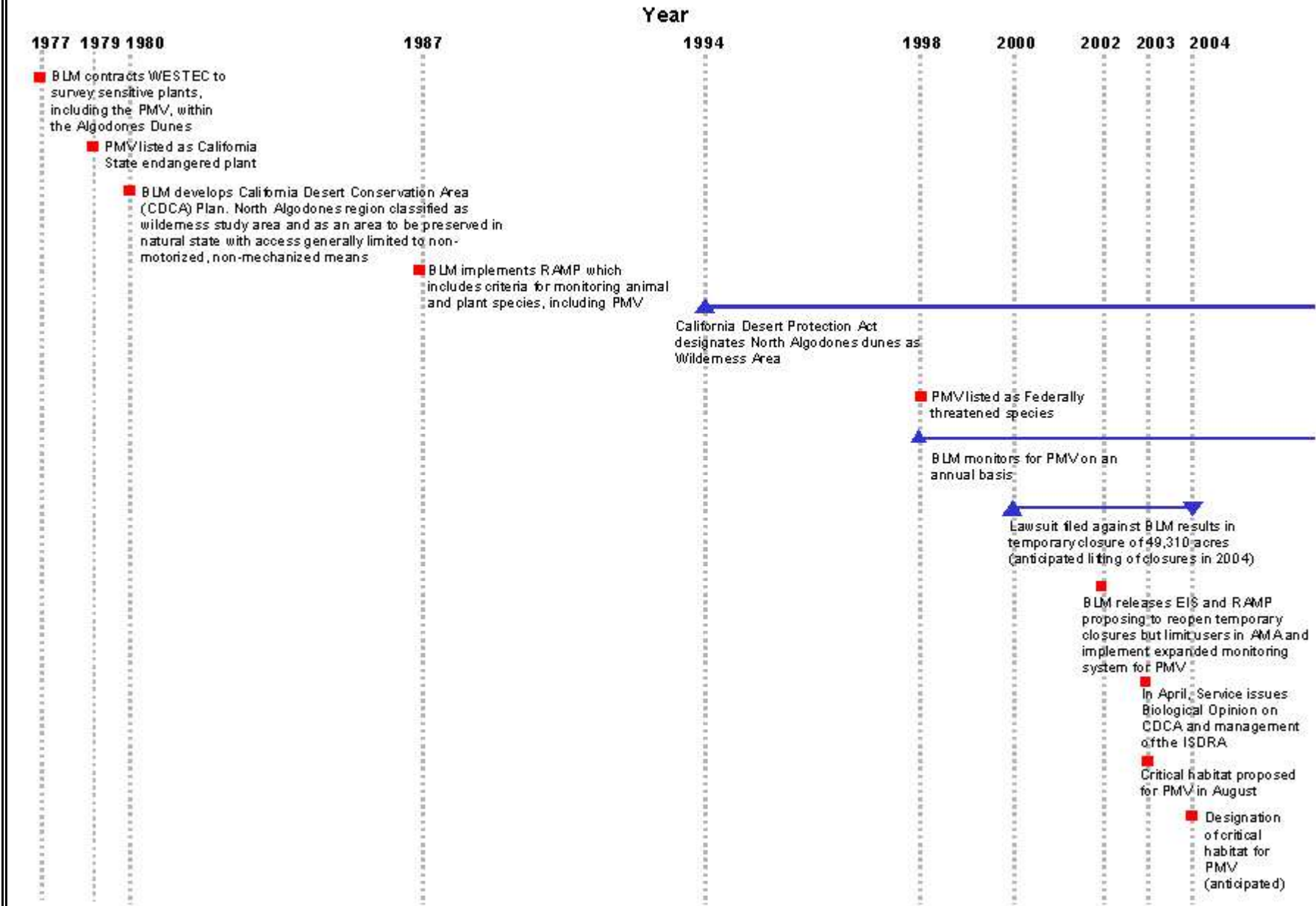
Exhibit 2-1				
ACREAGE OF BLM MANAGEMENT AREAS AND PROPOSED CHD				
Management Area	ISDRA		Proposed Critical Habitat	
	Number of Acres	Percent of ISDRA	Number of Acres	Percent of Management Area
Adaptive Management Area	33,289	20.93%	11,529	35%
Buttercup	7,842	4.93%	1,589	20%
Dune Buggy Flats	16,658	10.47%	0	0%
Gecko	21,225	13.34%	8,363	39%
Glamis	24,041	15.11%	9,087	38%
Mammoth Wash	8,105	5.1%	5,208	64%
North Algodones Wilderness	26,202	16.47%	11,301	43%
Ogilby	21,710	13.65%	5,355	25%
Total	159,072	100%	52,432	33%
Notes: Acres reported for ISDRA and Management Areas are based on the most recent data presented in BLM's Imperial Sand Dunes Recreation Area Management Plan, May 2003. These data reflect BLM managed land and exclude acreage associated with private and state land.				
Source: BLM RAMP, U.S. Fish and Wildlife Service				

66. Many developed areas within the ISDRA, including buildings, store and vendor sites, roads, parking lots, railroad tracks, canals, and other paved areas have been *excluded* from the proposed designation. The Service has also attempted to avoid designating many intensive areas of recreational use within the ISDRA. As such, the economic impact of a closure on any proposed designation portion of a management area would likely have a lesser impact than the closure of the same size area in the non-designation portion of that management area. Exclusion of certain areas was determined through discussions between the Carlsbad Fish and Wildlife Service and the El Centro BLM office on the basis that these areas are unlikely to contain the primary constituent elements for the PMV. (Service, 2003a) For example, Patton Valley within the Ogilby Management Area is visited heavily by off-highway vehicle (OHV) users. Although located away from developed areas within the ISDRA, this area has been excluded from the proposed CHD as it lacks the primary constituent elements for the PMV. While representing many use areas, these exclusions do

not represent all areas where individuals use the ISDRA. Recreational and non-recreational use does occur within the boundaries of the proposed CHD.

67. The vast majority, or 95.6 percent, of the proposed CHD within the ISDRA is federally owned and managed by the BLM. Small portions, or 2.9 percent, are privately held in Adaptive Management Area, Dune Buggy Flats, Gecko, Glamis, Mammoth Wash, North Algodones Wilderness, and Ogilby. The remaining 1.6 percent of the proposed CHD is owned by the State of California and managed by the State Lands Commission.
68. The BLM has managed the ISDRA since 1972. Over the past three decades, a number of Federal and state regulations and management directives have guided or directed BLM's management of the ISDRA and provided protection to the PMV. Figure 2-2 provides a time line of past regulatory actions that have afforded protection to the PMV and its habitat.

Figure 2-2
TIMELINE OF PAST PMV-RELATED REGULATORY ACTIONS



2.2 Ecology of ISDRA

69. The Algodones Dunes are the largest contiguous mass of sand dunes in California. The dunes reach a height of 300 feet above the plain, extend over 40 miles along the eastern edge of the Imperial Valley agricultural region, and average five miles in width. The Imperial Sand Dunes Recreation Area (ISDRA) is bordered on the west by the Coachella Canal, which delivers Colorado River water to the north and to the east by the Union Pacific Railroad. Immediately to the south is the Mexican Border. Highway 78 transects the ISDRA just south of the North Algodones Wilderness management area. Interstate 8 runs along the south boundary of the dunes.
70. The ecology of the ISDRA varies with dune characteristics. The central or interior areas of the ISDRA are characterized by psammophytic or "sand loving" scrub, which is distinguished by a large number of plants restricted entirely or largely to an active dune area (Service, 2003a). Psammophytic scrub occurs most frequently between active dunes in areas that form depressions. The periphery areas of the dunes, particularly the western edge, are characterized by creosote bush scrub, which occurs as widely spaced shrubs and is interspersed with bare ground (BLM, 2003d; Service, 2003a).
71. PMV is generally found on open sand dunes in psammophytic scrub. Therefore, while critical habitat is proposed in some periphery dunes, the bulk of the proposed CHD occurs primarily in the central, psammophytic scrub areas of the ISDRA. The primary constituent elements of critical habitat for the PMV consist of intact, active sand dune systems (defined as sand areas that are subject to sand-moving winds that result in natural expanses of slopes and swales) within the historical range of PMV. These systems are characterized by substrates of the Rositas soil series, specifically Rositas fine sands,²⁷ of a specific type and depth sufficient to promote PMV and discourage creosote bush scrub growth; and wind-formed slopes of less than 30 degrees, but generally less than 20 degrees (Service, 2003a).
72. The Service has proposed to designate as critical habitat for the PMV areas that are occupied, in any given year, by standing plants, root crowns, or the soil seed bank. Areas where the plant has not been found but are contiguous with areas where the plant has been encountered and possess the primary constituent elements are considered occupied and have been included in the proposed CHD (Service, 2003a).

2.2.1 Other ISDRA Protected Species

73. Several Federal, state, and locally-protected species may be found within the proposed CHD for the PMV. Two federally endangered species, the desert tortoise (*Gopherus agassizii*) and the southwestern willow flycatcher (*Empidonax trailii extimus*),

²⁷ Rositas fine sand are deep, somewhat excessively drained sloping soils formed in wind-blown sands of diverse origin (Service, 2003a).

are known to occur or have the potential to occur within the proposed CHD. However, critical habitat for these species does not occur within proposed CHD for the PMV or within the ISDRA (Service, 2003a; BLM, 2003b). Exhibit 2-2 lists the various protected species that are known or have the potential to occur in the ISDRA.

Exhibit 2-2 SPECIES THAT MAY OCCUR OR HAVE THE POTENTIAL TO OCCUR IN PEIRSON'S MILK-VETCH CRITICAL HABITAT			
Common Name	Scientific Name	Category	Status
Desert tortoise	<i>Gopherus agassizii</i>	Reptile	Federally and State Threatened
Southwestern Willow Flycatcher	<i>Empidonax trailii extimus</i>	Bird	Federally and State Endangered
Algodones Dunes sunflower	<i>Helianthus niveus</i> ssp. <i>tephrodes</i>	Plant	State Endangered
Gila Woodpecker	<i>Melanerpes uropygialis</i>	Bird	State Endangered
Peregrine falcon	<i>Falco peregrinus</i>	Bird	State Endangered
Western Yellow Billed Cuckoo	<i>Coccyzus americanus occidentalis</i>	Bird	State Endangered
Arizona Bell's Viero	<i>Viero bellii arizonae</i>	Bird	State Endangered
Giant Spanish needle	<i>Palafoxia arida</i> var. <i>gigantea</i>	Plant	BLM Sensitive Species
Munz's cholla	<i>Opuntia munzii</i>	Plant	BLM Sensitive Species
Orocopia sage	<i>Salvia greatei</i>	Plant	BLM Sensitive Species
Sand food	<i>Pholisma sonorae</i>	Plant	BLM Sensitive Species
California leaf-nosed bat	<i>Macrotus californicus</i>	Mammal	BLM Sensitive Species
Cave myotis	<i>Myotis velifer</i>	Mammal	BLM Sensitive Species
Spotted bat	<i>Euderma maculatum</i>	Mammal	BLM Sensitive Species
Townsend's big-eared bat	<i>Plecotus townsendii</i>	Mammal	BLM Sensitive Species
Burrowing Owl	<i>Athene cunicularia</i>	Bird	BLM Sensitive Species
Couch's spadefoot toad	<i>Scaphiopus couchi</i>	Amphibian	BLM Sensitive Species
San Sebastian leopard frog	<i>Rana yavapaiensis</i>	Amphibian	BLM Sensitive Species
Flat-tailed horned lizard	<i>Phrynosoma mcallii</i>	Reptile	BLM Sensitive Species
Source: BLM, 2003b			

74. If a section 7 consultation is triggered for any listed species, the consultation process will also take into account all other listed species known or thought to occupy areas on or near the project lands. As such, listing or critical habitat-related protections for other threatened or endangered species may benefit the PMV as well. However, based on the limited presence of the other Federally-listed threatened and endangered species and a consultation history driven exclusively by the presence of the PMV, all future section 7 consultations within the extant boundaries of the proposed CHD are anticipated to be triggered by the presence of the PMV and its critical habitat. That is, this analysis has determined that impacts of actions for these species are not relevant for understanding the impact of the proposed CHD for the PMV.

2.3 Activities in the ISDRA

75. The ISDRA is one of the most intensively visited recreational areas in the western United States (BLM, 2003d). The primary recreational activity within the ISDRA is Off-Highway Vehicle (OHV) recreation, which draws over a million visitors to the region each year (BLM). The size of the dunes in terms of acreage and height provides unique opportunities for OHV recreation. Large dunes can reach up to a height of 300 feet above the plain. Moreover, with OHV activity permitted on more than two-thirds of the region, the ISDRA remains one of the largest dune system open to OHV users in the southwest (BLM, 2003d).
76. OHV activity in the ISDRA consists of driving all-terrain vehicles (ATVs), including dune buggies, quads, and four wheel drive vehicles, over and around the dunes. OHV enthusiasts also use Recreational Vehicles (RVs) to camp in the dunes' various designated campgrounds. The ISDRA occasionally experiences organized competitive or commercial OHV events such as sand drags, closed-course racing, and hill climbs (BLM, 2003d).
77. A variety of non-motorized recreation also occurs within the ISDRA, including hiking, backpacking, nature studies, walking, hunting, rock collecting, and horseback riding. These activities typically take place away from concentrated OHV activity sites and within designated non-motorized recreational areas. Most non-motorized recreational activities within the ISDRA occur within the North Algodones Wilderness Area (BLM, 2003d).
78. Other less popular types of ISDRA activities and land uses include: private residential use; private commercial use; military training; management of sensitive natural resources; law enforcement facilities; educational centers; commercial vendors; conservation activities (e.g., dune-wide cleanup events); right-of-way use for utility lines; canals; road construction and maintenance; and commercial filming and photography. Mineral extraction and organized guided tours do not currently exist but have the potential to occur in the future (BLM, Knauf and Hamada, October 17, 2003). The proximity of the dunes to the Mexican border, particularly near Buttercup Valley, contributes to a significant level of Border Patrol activities, which include patrolling, chasing, and sign, sensor, and fence installation (BLM, Knauf and Hamada, October 17, 2003).

79. Motorized and non-motorized recreational activities that currently occur within the ISDRA have the potential to occur within the boundaries of the proposed designation for the PMV. In fact, some of these activities currently do occur within proposed CHD boundaries. Recreational activities currently occurring within the proposed CHD include OHV use, camping, hiking, backpacking, walking, photography, and horseback riding. Non-recreational activities that occur within the proposed CHD include conservation activities and border patrol activities. Some ISDRA land-use activities that currently do not occur within the proposed CHD have the potential to occur over the next 20 years. These activities include: utilities construction; canal maintenance and repair; road construction and repair; and commercial filming and photography (BLM, Knauf and Hamada, October 17, 2003). While these activities have the potential to trigger section 7 consultations, the BLM has stated that the likelihood of these non-recreational activities occurring within the proposed CHD is minimal (BLM, Knauf and Hamada, October 17, 2003; BLM, December 2, 2003). First, areas likely to experience development have been excluded from the proposed CHD. Second, these non-recreational activities would be discouraged by BLM in the proposed CHD areas for potentially interfering with the recreational function of the ISDRA. Third, construction and maintenance (such as utility lines) away from current roads, canals, and railways and through the central, more remote portions of the dunes is likely to be economically infeasible (BLM, December 2, 2003).
80. The Federal agency most likely to fund, authorize, or carry out activities that have the potential to adversely affect the PMV and its habitat include the BLM and the United States Border Patrol.
81. Overall, OHV use is the predominant activity occurring within the ISDRA. While the ISDRA offers opportunities for non-OHV recreation, such as horseback riding and hiking, these activities occur infrequently relative to OHV-based recreation (BLM, March 1, 2004). BLM notes that the North Algodones Wilderness Area, which is closed to non-motorized recreation but open to all other activities, experiences approximately six groups of visitors per year. Based on historic use patterns, non-OHV related activity levels are expected to remain relatively modest in the future. As such, this analysis focuses on OHV activity and the contribution of OHV recreation to the regional economy.

2.3.1 OHV Activity

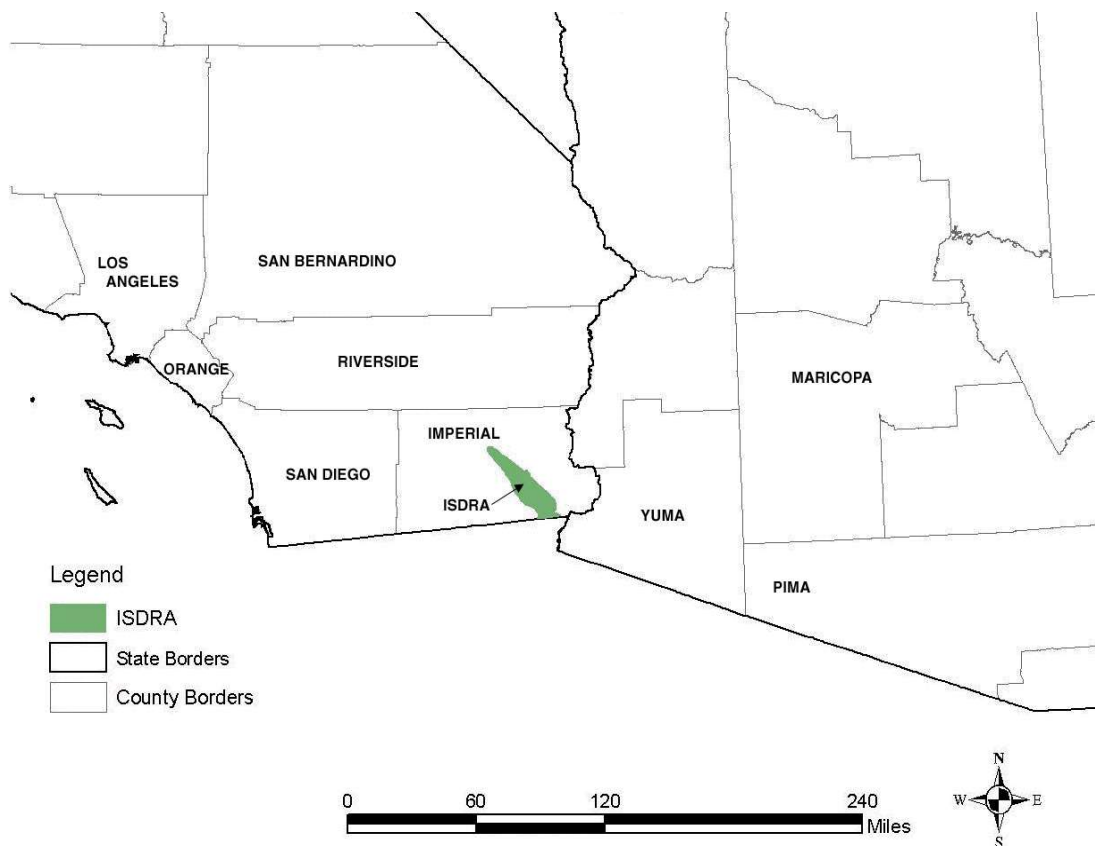
82. OHV activity is considered a threat to the PMV by contributing to the destruction of plants and modification of habitat. Biological surveys and studies conclude that vehicles may have a direct impact on the plants by crushing and killing them or reducing their reproductive output. OHV activity may also artificially scarify seeds, prematurely exposing them to dessication or germination. Vehicles may also affect dune structure by altering hydrological traits of the dune, covering standing plants with encroaching sand, or exposing standing plants by causing sand to fall away from the plants. Studies have observed impacts to the PMV at and near OHV gathering, or “staging” sites. Studies have also indicated that

OHV use does not tend to encroach on habitat of the plants that are located in distant open dune areas, away from concentrated staging areas. (Service, 2003a)

83. OHV use tends to occur in concentrated areas within the ISDRA. High-use areas are typically adjacent to highways, sand highways, and major camping grounds. In addition, the dunes feature various points of interest to which dune enthusiasts flock, such as staging sites. Of the management areas, Glamis, Gecko, and Buttercup Valley experience the most intense levels of OHV visitation (BLM, November 20, 2003). OHV recreation does not occur within the North Algodones Wilderness Area nor within the 49,310 acres currently closed (majority of Adaptive Management Area) a result of the 2000 lawsuit. Information on OHV visitation patterns within the various ISDRA management areas are presented in detail in Section 3.2.1 "OHV Use."
84. As mentioned in Section 2.1 "Designation," the Service has avoided designating many of the concentrated use areas in the ISDRA, in particular intensive OHV activity areas. The Service has avoided designating many major staging sites, campgrounds, and disturbed areas along roadways. However, these areas are not all-inclusive. That is, OHV use and OHV-related use does occur within the boundaries of the proposed CHD.

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85. This section summarizes key economic and demographic information for the counties likely to be impacted by the proposed CHD for the PMV. Because OHV use is the predominant activity occurring within the proposed CHD, this economic analysis focuses on potential OHV-related impacts. As such, this section presents information on those counties likely to be impacted by OHV activity in the proposed CHD. County level data are presented to provide context for the discussion of potential economic impacts and to illuminate trends that may influence these impacts.
86. While the proposed CHD occurs within the boundaries of Imperial County, the primary economic study area for this analysis includes both Imperial County, California, and Yuma County, Arizona. The bulk of expenditures for OHV trips to the ISDRA, in terms of consumable goods, occur in Imperial and Yuma Counties (BLM, 2003b; ASA, 2003). These expenditures include fuel, food, camping supplies, medical supplies and services, and equipment repairs. Businesses within the two counties benefit from the hundreds of thousands of visitors who visit the ISDRA annually and incur significant trip-related expenditures within the region (BLM, 2003b; Imperial County Board of Supervisors, November 24, 2003; Brawley Chamber of Commerce, December 2, 2003).
87. The ISDRA draws visitors from several counties in California and Arizona. Thus, visitors originate from and purchase OHV-related equipment in six counties in California (Los Angeles, San Diego, Orange, San Bernardino, Riverside, and Imperial County) and three counties in Arizona (Yuma, Pima, and Maricopa). Accordingly, OHV-related businesses benefit from the expenditures made outside Imperial and Yuma Counties (BLM, 2003d). Figure 3-1 shows the geographic relationship between the ISDRA and these major counties of origin (referred to as the secondary study area).

FIGURE 3-1
NINE COUNTIES FROM WHICH THE MAJORITY OF ISDRA-BOUND
RECREATIONISTS ORIGINATE



88. This analysis focuses on potential impacts of the proposed CHD on the primary economic study area. While some expenditures on equipment and consumable goods are made outside the primary study area, any potential impacts of the proposed CHD are likely to have a greater impact on Imperial and Yuma Counties.

- First, these two counties have historically experienced greater levels of unemployment and have a less diverse economic base. Any reduction in ISDRA visitation is therefore likely to adversely impact local businesses, and the overall regional economy.
- Second, while any reduction in ISDRA visitation may affect OHV-related businesses located within counties outside of Imperial and Yuma, these impacts are anticipated to be small relative to the overall size of the counties' economies.
- Third, OHV-related businesses located outside of Yuma and Imperial may not be impacted by any potential reduction in ISDRA visitation as OHV enthusiasts may decide to visit other OHV areas in California, Arizona, and neighboring states. Accordingly, decreased expenditures within Imperial and Yuma Counties may be offset by increased expenditures within other OHV areas (see Exhibit 3-8 for information on substitute OHV sites). This analysis does not quantify the expenditures OHV users make on vehicles or related equipment (e.g., campers), because these purchases are likely made over a broader geographic area. The impact associated with changes of vehicle expenditures is not expected to have a significant impact outside of Imperial and Yuma Counties, because the majority of these counties are large, with diverse economies (e.g., Los Angeles).

89. To provide context and comparison for the economic analysis, demographic information are provided for both the primary and secondary economic study areas. Specifically, this section presents an economic profile of counties in the broader study area, focusing on Imperial and Yuma Counties. This section also discusses economic activities in the ISDRA region in detail.

3.1 Economic Profile of Imperial and Yuma Counties

90. Both Imperial and Yuma Counties experienced significant population growth from 1990 to 2000 (Exhibit 3-1). Imperial County is anticipated to grow rapidly over the next 20 years, with the population projected to double by 2020. The principal economic sectors in both counties are agriculture and related industries, retail trade, and services. Both counties have experienced high levels of unemployment over the past decade.

3.1.1 Population Patterns

91. In 2000, Imperial County had a population of 142,361, a 30 percent increase from a population of 109,303 in 1990. The County is anticipated to experience dramatic growth over the next twenty years, with population forecast to reach 294,200 in 2020, a 107 percent

increase. From 1990 to 2000, Yuma County's population increased by nearly 50 percent (from a population of 106,895 to 160,026). Yuma County's population is anticipated to grow by 31 percent over twenty years, less than the State of Arizona's projected 44 percent growth. As Exhibit 3-1 illustrates, all counties within the broader study area are forecast to experience significant population growth over 20 years (California Department of Finance, 2003; AZ DES, 2003b).

Exhibit 3-1						
POPULATION ESTIMATES FOR THE NINE COUNTIES IN THE BROADER STUDY AREA						
	1990	2000	2010	2020	% Increase 1990-2000	% Increase 2000-2020
United States	248,709,873	281,421,906	--	--	13.15%	--
California	29,760,021	33,871,648	40,262,400	45,821,900	13.8%	35.3%
Imperial	109,303	142,361	217,500	294,200	30.2%	106.7%
Los Angeles	8,863,164	9,519,338	10,605,200	11,584,800	7.4%	21.7%
Orange	2,410,556	2,846,289	3,266,700	3,541,700	18.1%	24.4%
Riverside	1,170,413	1,545,387	2,159,700	2,817,600	32.0%	82.3%
San Bernardino	1,418,380	1,709,4s34	2,231,600	2,800,900	20.5%	63.8%
San Diego	2,498,016	2,813,833	3,388,400	3,863,500	12.6%	37.3%
Arizona	3,665,228	5,130,632	6,145,108	7,363,604	40.0%	43.5%
Yuma	106,895	160,026	171,689	209,861	49.7%	31.1%
Pima	666,880	843,746	1,031,623	1,206,244	26.5%	43.0%
Maricopa	2,122,101	3,072,149	3,709,566	4,516,090	44.8%	47.0%
Sources:						
[1] U.S. Census Bureau, State & County QuickFacts, http://quickfacts.census.gov/qfd/ .						
[2] California Department of Finance, Demographic Research Unit, "Interim County Population Projections, Estimated July 1, 2000 and Projections for 2005, 2010, 2015 and 2002", http://www.dof.ca.gov/HTML/DEMOGRAP/repndat.htm#projections .						
[3] Arizona Department of Economic Security, Population Statistics, http://www.de.state.az.us/links/economic/webpage/popweb/coproj97.html .						

3.1.2 Business Patterns

92. The U.S. Census Bureau provides information on annual payrolls and the number of businesses within Imperial and Yuma County industries. In 2001, the principal industries within Imperial County, in terms of annual payroll, included services and retail and wholesale trade. Annual payroll within these industries totaled \$315 million, representing 62 percent of the total County payroll. For all of Imperial County, 2,270 businesses with one or more paid employee had a collective annual payroll of \$593.3 million.
93. In 2001, Yuma County had a total payroll of approximately \$715 million. The industries with the largest annual payrolls included services, retail trade, and construction. Payroll within the services sector generated nearly 40 percent of the total County payroll, while retail trade and construction accounted for approximately 19 and 10 percent of total payroll.
94. Exhibit 3-2 provides industry and payroll data for Imperial and Yuma Counties. The “Total Establishments” column displays the total number of physical locations at which business activities are conducted with one or more paid employee in the year 2001. These figures provide a measure of the average density of commercial and industrial establishments in the region.

Exhibit 3-2 2001 COUNTY BUSINESS PATTERNS - IMPERIAL AND YUMA COUNTIES (2001 Dollars)						
	Imperial County			Yuma County		
Industry	Annual Payroll (\$1,000)	% Total Annual Payroll	Total Establishments	Annual Payroll (\$1,000)	% Total Annual Payroll	Total Establishments
Forestry, Fishing, Hunting, and Agriculture support	\$13,690	2.3%	36	\$16,905	2.4%	40
Mining	\$0	0.0%	5	\$0	0.0%	6
Utilities	\$19,175	3.2%	10	\$12,498	1.7%	9
Construction	\$47,519	8.0%	155	\$73,397	10.3%	262
Manufacturing	\$47,075	7.9%	61	\$54,499	7.6%	77
Wholesale trade	\$54,704	9.2%	211	\$57,050	8.0%	126
Retail trade	\$130,173	21.9%	497	\$134,413	18.8%	476
Transportation & Warehousing	\$30,066	5.1%	172	\$18,956	2.7%	84
Information	\$13,049	2.2%	32	\$15,285	2.1%	27
Finance, Insurance, & Real Estate	\$37,811	6.4%	196	\$37,554	5.3%	39
Services	\$184,822	31.2%	865	\$281,899	39.4%	259
Auxiliaries	\$0	0.0%	7	\$0	0.0%	7
Unclassified establishments	\$0	0.0%	23	\$0	0.0%	32
Total	\$593,257	100.0%	2,270	\$714,979	100.0%	2,539
Source: U.S. Census Bureau, County Business Patterns, http://censtats.census.gov/cbpnaic/cbpnaic.shtml .						

3.1.3 Employment by Industry

95. The California Employment Development Department and the Arizona Department of Economic Security provide information on employment within Imperial and Yuma Counties. Within these counties, the largest employment sectors are agriculture, trade, services, and government. In 2002, nearly 33 percent of the total jobs in Imperial County were government-related. Agriculture employment represented approximately 20 percent of the job base while employment within the trade and services sectors constituted 32 percent

of all jobs in the County. In Yuma County, employment within the agriculture sector represented approximately 35 percent of total jobs. The trade and services industries employed approximately 34 percent of the working force. Government employment accounted for nearly 19 percent of all jobs. Exhibit 3-3 summarizes the employment by industry in Imperial and Yuma Counties in 2002.

Exhibit 3-3 EMPLOYMENT BY INDUSTRY Imperial and Yuma Counties 2002 Average				
	Imperial County		Yuma County	
Industry	Number Employees	% Total Employees	Number Employees	% Total Employees
Agriculture	10,000	19.7%	22,902	35.3%
Construction and Mining	1,800	3.5%	2,825	4.4%
Manufacturing	2,500	4.9%	1,950	3.0%
Transportation and Public Utilities	1,700	3.3%	1,625	2.5%
Retail and Wholesale Trade	7,700	15.2%	11,300	17.4%
Information	400	0.8%	N/A	N/A
Finance, Insurance, and Real Estate	1,400	2.8%	1,350	2.1%
Services	8,700	17.1%	10,575	16.3%
Government	16,600	32.7%	12,275	18.9%
Total Employment	50,800	100.0%	64,802	100.0%
Source: California Employment Development Department, http://www.calmis.ca.gov/htmlfile/county/imperial.htm Arizona Department of Economic Security, http://www.de.state.az.us/links/economic/webpage/index.html N/A indicates information not available.				

3.1.4 Unemployment

96. Both Imperial and Yuma Counties have experienced high unemployment. Imperial County has the highest unemployment rate of all counties in the State of California. Average unemployment in 2003 was 19.5 percent, well above California's rate of 6.7 percent. Yuma County also experiences high unemployment relative to the State of Arizona and the U.S. In 2003, Yuma County's unemployment was 24.9 percent, compared to a state rate of 5.8 percent. Severe unemployment in both counties has been attributed to the seasonal nature of the agricultural industry, which employs approximately 22 percent of the Imperial

County's labor force and 35 percent of Yuma County's labor force. Exhibits 3-4 and 3-5 summarize unemployment rates for Imperial and Yuma Counties and major cities within the counties.

Exhibit 3-4 UNEMPLOYMENT - IMPERIAL COUNTY AND MAJOR CITIES						
Year	Imperial County	Brawley City	El Centro City	Calexico City	California	All U.S.
1990	25.40%	25.90%	24.60%	33.50%	5.80%	5.6%
1995	29.30%	29.90%	28.40%	38.00%	7.80%	5.6%
2000	26.30%	26.80%	25.50%	34.50%	4.90%	4.0%
2003 to date	19.5%	-	-	-	6.7%	6.0%
Source: Bureau of Labor Statistics and California, Employment Development Department, Labor Market Information, http://www.calmis.ca.gov/htmlfile/subject/lftable.htm .						

Exhibit 3-5 UNEMPLOYMENT - YUMA COUNTY AND MAJOR CITIES				
Year	Yuma County	Yuma City	Arizona	All U.S.
1990	21.4%	14.8%	5.5%	5.6%
1995	28.6%	20.3%	5.1%	7.80%
2000	27.7%	19.6%	4.0%	4.90%
2003 to date	24.9%	-	5.8%	6.0%
Bureau of Labor Statistics and Arizona Department of Economic Security, http://www.de.state.az.us/links/economic/webpage/index.html .				

3.2 Economic Activities in ISDRA-Region

97. The principal economic activity occurring within the ISDRA is OHV recreation. Over a million individuals visit the dunes each year, and spend millions of dollars on consumable goods and services. Visitation rates to the ISDRA have climbed steadily over the years and are anticipated to continue to trend upward over the next ten years (BLM, 2003b; CA DSPR, November 20, 2003). Several businesses located in the major towns within Imperial and Yuma Counties are dependent on the recreational activities that occur

within the ISDRA, specifically OHV activities. Any reduction in the number of trips made to the dunes is likely to adversely impact these businesses and the overall regional economy.

98. The ISDRA offers opportunities for non-OHV based recreation such as hiking, horseback riding, birdwatching, and photography. However information provided by BLM indicate that these activities occur infrequently within the dunes. BLM notes that the North Algodones Wilderness Area, which has been closed motorized vehicles since 1980 but open to all other recreation, experiences on average a half-dozen groups of visitors per year. Based on historic use patterns, non-OHV related activity levels are expected to remain relatively modest in the future.

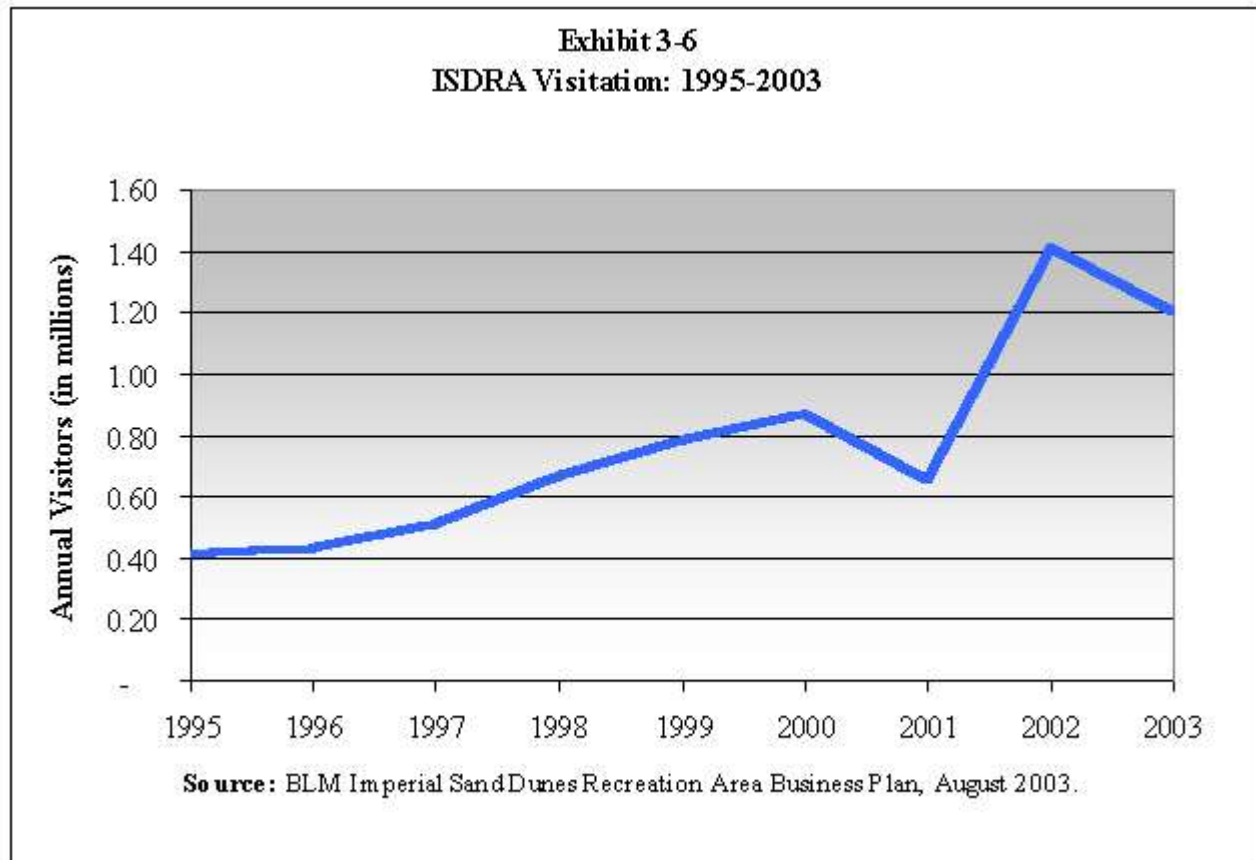
3.2.1 OHV Use

99. The demand for OHV recreation within the State of California has doubled over the past twenty years. According to a study published by California State Parks, the number of registered OHVs within the state, including ATVs, dune buggies, sand rails, and dirt bikes, has increased by 108 percent since 1980 (CA DSPR, 2001). Data compiled by the Department of Off-Road Vehicle Recreation reveal that over the past five years, the number of registered OHVs within the state has increased on average by 13.1 percent per year.²⁸ While demand for OHV recreation has increased within the state, the number of acres available for OHV use has declined by nearly 50 percent over the past twenty years (CA DSPR, 2001).
100. The ISDRA is one of the most frequently visited OHV areas in California. In 2002, an estimated 1.4 million people visited the dunes, with the majority of visitation occurring during holiday weekends. During high-use holiday weekends, such as Thanksgiving, the ISDRA is visited by as many as 200,000 individuals (BLM, Knauf & Hamada, October 2003). While visitation fluctuates annually, BLM projects a steady growth in visitation over the next ten years (BLM, 2003b; BLM, 2003c; BLM, Knauf and Hamada, October 17, 2003).
101. ISDRA visitation has increased since 1995. Exhibit 3-6 tracks ISDRA visitation over the past eight years.²⁹ The drastic change in visitation estimates between 2001 and 2002 is attributed to the change in BLM's counting methodology. Prior to 2002, BLM extrapolated visitation through employing on-the-ground and fly-over estimates of vehicles during peak weekends. In 2002, BLM installed underground vehicle counters at each major ISDRA entrance point. Accordingly, accurate visitation data by management area prior to the 2002 recreation season is not available. (BLM, 2003c; BLM, November 20, 2003). Another

²⁸ Data collected by the California State Parks, Off-Highway Motor Vehicle Recreation Division.

²⁹ Historical estimates of the number of trips taken to the ISDRA are based on a number of sources of information, including vehicle counters and aerial overflights. As such, these data represent estimates of visitation, not exact counts. Moreover, this graphic reflects estimates of the number of visitors based on vehicle counts and the BLM assumption that, on average, there are 3.5 OHV visitors per vehicle (BLM, 2003c).

source of information on visitation is based on the ISDRA visitation fee. BLM has charged a visitation fee since the time prior to the listing of the PMV. While these revenue data are available on an annual basis for the ISDRA as a whole, these data do not reflect actual visitation because compliance with paying the fee has been an issue (BLM, 2003c).



102. Within the ISDRA, certain areas typically experience higher rates of visitation relative to other areas. BLM provided seasonal per-trip information for 2002 and 2003 that describes the level of visitation in the eight BLM-defined management areas (Exhibit 3-7).³⁰ As the exhibit illustrates, Glamis experiences the highest level of OHV activity, with visitation accounting for nearly 50 percent of total trips taken in 2003. Located just south of Highway 78 and adjacent to vendors and stores, Glamis also contains numerous staging sites where OHV users congregate, including Competition and Oldsmobile Hill. Gecko and Buttercup Valley also experience significant OHV activity, with 2003 visitation constituting 36 percent of total trips. These two management areas are also located adjacent to highways and include major staging sites. Dune Buggy Flats experiences moderate level use, with

³⁰ The OHV season begins in October and ends in May of the following year.

collective trips representing 15 percent of all trips. Ogilby and Mammoth Wash experience low levels of visitation, with the number of trips in both management areas representing less than 3.5 percent of total trips in 2003.

103. OHV opportunities within the ISDRA have been regulated twice over the past ten years. First, subsequent to the passage of the California Desert Protection Act (CDPA), the North Algodones dunes were designated a Wilderness Area and closed off to motorized recreation. Second, after the 2000 lawsuit against BLM, 49,310 acres, primarily within the Adaptive Management Area, were closed temporarily to OHV use. These restrictions on OHV use in the two areas are apparent in the visitation patterns in Exhibit 3-7.

Exhibit 3-7				
NUMBER OF TRIPS PER YEAR BY ISDRA MANAGEMENT AREA				
	2002 Season		2003 Season	
Management Area	Trips	% Total	Trips	% Total
Adaptive Management Area	0	0.0%	0	0.0%
Buttercup Valley	59,968	14.8%	64,437	18.1%
Dune Buggy Flats	48,206	11.9%	53,895	15.2%
Gecko	115,455	28.5%	63,759	17.9%
Glamis	167,257	41.3%	162,271	45.6%
Mammoth	130	0.0%	144	0.0%
North Algodones Wilderness Area	0	0.0%	0	0.0%
Ogilby	13,913	3.4%	11,198	3.1%
Totals	404,929	100.0%	355,704	100.0%
Source: BLM El Centro Field Office				
Note: Gecko and Glamis experienced a decline in visitation from 2002 to 2003, accounting for an overall drop in visitation to the ISDRA. BLM notes that visitation is subject to fluctuation based on weather and economic conditions. In addition, overall enforcement in the ISDRA has increased over the past two years. As Glamis and Gecko are the more accessible and heavily visited management areas within the ISDRA, visitation in these areas may be more responsive to changes in enforcement and weather and economic conditions than other areas. These estimates reflect vehicle trips taken by OHV use parties (i.e., all individuals in a vehicle) to the management areas. Trips taken to the ISDRA on average involve 3.5 individuals per group and two nights per trip (BLM, 2003c).				

ISDRA Substitute Sites

104. Several OHV dune areas exist in other parts of California and Arizona and neighboring states, including Oregon and Nevada, that provide similar recreational experiences for recreationists. While a number of OHV enthusiasts visit the ISDRA exclusively, many also visit these other areas (BLM, Knauf and Hamada, October 17, 2003; ASA, November 18, 19, 20, and 24, 2003). The areas most often visited by ISDRA users are listed below, along with information on the number of acres available to motorized recreation at these sites. Most of these areas offer dune systems for recreation. With over 83,000 acres currently open to OHV use, the ISDRA remains one of the largest dune systems available for motorized-recreation in the region.

Exhibit 3-8				
ISDRA SUBSTITUTE SITES AVAILABLE FOR OHV DUNE RECREATION				
OHV Area	Location	Managing Agent	Approximate distance from Los Angeles/San Diego	Acres Available to OHV use / Type of Terrain
Dumont Dunes	San Bernardino County, CA	BLM	115 / 176 miles	8,150 acres; dunes
Hot Well Dunes	Cochise Couty, AZ	BLM	590 / 515 miles	2,000 acres; dunes
Oceano Dunes State Recreation Vehicle Area	Oceano County, CA	CA State Parks	190 / 315 miles	1,500 acres of 2,600 total acreage; beaches, dunes
Ocotillo Wells	San Diego & Imperial Counties, CA	CA State Parks	150 / 90 miles	42,000 acres; dunes
Oregon Dunes National Recreation Area	Coos County, OR	Forest Service	860 / 980 miles	5,930 acres; dunes
Plaster City/Yuha Basin	Imperial County, CA	BLM	210 / 95 miles	41,000 acres; hills, desert flats
Sand Mountain	Churchill County, NV	BLM	580 / 700 miles	5,000 acres; dunes
Superstitious Mountain	Imperial County, CA	BLM	200 / 130 miles	13,000 acres; dry lakes, badlands, rocky mountains, dunes
ISDRA	Imperial County, CA	BLM	225 / 155	83,560 acres of 159,072 total acreage; dunes
While several OHV areas exist within California and neighboring states, the listed areas are areas most likely to be visited by ISDRA users, based on conversations with BLM and various off-road vehicle recreation organizations. Information BLM Business Plan, San Diego Off Road Coalition Website (http://www.sdorc.org/), BLM California Off-Highway Vehicles Area website (http://www.ca.blm.gov/caso/ohv.html), California State Parks Off-Highway Motor Vehicle Recreation Division (http://ohv.parks.ca.gov/default.asp?page_id=23138), personal communication with BLM, American Sand Association, Glamis Online, Off Road Business Association.				

105. The main counties that the ISDRA draws visitors from include Los Angeles, San Diego, Orange, San Bernardino, Riverside, and Imperial Counties in California, and Yuma, Pima and Maricopa in Arizona. As Figure 3-2 shows, the OHV sites available for enthusiasts are distributed widely over the west coast region. Three sites, Ocotillo Wells, Superstitious Mountain, and Dumont Dunes, closest to the ISDRA provide dunes for recreation. Each of these sites are significantly smaller than the ISDRA: Ocotillo Wells is approximately half the size, and Superstitious Mountain and Dumont Dunes are between 10 percent and 15 percent the size of the ISDRA. The next closest - Oceano Dunes and Hot Well Dunes - provide only two percent of the landmass of the ISDRA.

Figure 3-2
ISDRA SUBSTITUTE SITES AVAILABLE FOR OHV RECREATION



Profile of ISDRA OHV Users

106. A 1998 survey conducted by BLM noted that 81.7 percent of OHV users who visit the ISDRA originate from California, 14.7 percent from Arizona, and 2.8 percent from other

states. According to BLM, the typical ISDRA user is male, a California resident, and between the ages of 18 and 30. Visitors typically visit the ISDRA with their families and spend anywhere from one to three nights at the dunes. The average ISDRA visitor makes three trips per year to the dunes (BLM, 2003c).

107. OHV users invest anywhere from \$10,000 up to \$80,000 in OHVs and OHV-related equipment, including RVs, tow vehicles, trailers, and supplies (BLM, Knauf and Hamada, October 17, 2003; ASA, November 20, 2003; ORBA, November 21, 2003). In 1998, the American Sand Association (ASA), an organization representing OHV interests within the ISDRA, conducted an informal survey to determine the expenditures incurred by OHV users visiting the ISDRA. The survey found that the average OHV user had approximately \$21,000 invested in off-road vehicles, \$8,500 invested in trailers, \$4,230 invested in support equipment, and approximately \$27,000 invested in camping equipment (including campers and RVs). The average family investment totaled approximately \$60,000 (ASA, November 19, 2003).
108. In 1993, the California Department of Parks and Recreation conducted a statewide study on OHV use. The study reported that on average, households that purchased OHVs and related equipment in 1993, spent \$2,219 on ATVs, \$5,018 on dune buggies, and \$11,980 in 4-wheel drives, with an additional \$14,649 on tow vehicles and \$2,912 on trailers (CA DSPR, 1994).
109. OHV recreation organizations, including the American Sand Association, also note that users purchase specially-prepared equipment for traveling the linear dunes within the ISDRA. These vehicles include specially prepared 4-wheel drives equipped with engines and lightweight dune buggies designed for these areas of the dunes. Users may spend anywhere from \$20,000 to \$50,000 on specialized equipment for longer travel within the ISDRA (ASA, November 19, 2003).

3.2.2 OHV-Related Activity

110. As noted above, the majority of expenditures associated with OHV recreation in the ISDRA occurs within Imperial and Yuma Counties (BLM, ASA). Each year millions of dollars are spent in the two counties as dune enthusiasts purchase trip-related goods and services. BLM's economic impact study within its Environmental Impact Statement concluded that current annual OHV expenditures total \$147.82 million in Imperial County and \$6.97 million in Yuma County (BLM, 2003b). An American Sand Association survey determined that in 1998, OHV users spent approximately \$126.7 million in the regional economy (ASA, 1998).

111. OHV users spend money on a variety of consumable goods and services, including fuel, lodging, food and groceries, supplies, repairs, and medical expenses. Categories of trip-related expenditures made by OHV users include:
- Groceries, Food and Drinks (grocers, liquor stores, restaurants, fast food stores)
 - Off-Highway Vehicle (retailers, repairs and services)
 - Transportation (including gas)
 - Lodging (including hotels and camping fees)
 - Other Expenses (e.g., supplies, medical expenses).
112. OHV users visiting the ISDRA typically incur trip-related expenditures in the major cities of Imperial and Yuma Counties. These cities include Brawley and El Centro in Imperial County and Yuma city within Yuma County. The average expenditures incurred by OHV users can range anywhere from approximately \$250 to \$500 per-trip per-vehicle (ASA, November 19, 2003; ORBA, November 21, 2003).
113. Several businesses that operate within Imperial and Yuma Counties are dependent on the recreational activities that occur within the ISDRA. Major towns in the counties have a number of small businesses that sell OHVs and OHV accessories and services and market to both local and tourist populations (Imperial County Board of Supervisors, November 24, 2003; Brawley Chamber of Commerce, December 2, 2003; ORBA, November 21, 2003). In addition, a number of small businesses exist within the geographical boundaries of the ISDRA itself, catering exclusively to dune visitors. Any reduction in visitation is likely to adversely impact these local businesses.

3.2.3 Public Provision of On-Site Services at the ISDRA

114. Accommodating the millions of visitors that visit the ISDRA each year requires the provision of additional services and on-site infrastructure by both BLM and local government agencies. BLM identifies various planned actions in the 2003 ISDRA Business Plan that are related to providing on-site infrastructure and services, including camping-related facilities, trash collection, sanitation, and pollution control measures. Implementing the planned actions related to these services are anticipated to cost BLM up to \$600,000 per year (BLM, 2003c; BLM, March 1, 2004).
115. Moreover, the high visitation that occurs at the ISDRA during holiday weekends between March and October necessitates the provision of additional enforcement and emergency services. During high-use holiday weekends, BLM employs as many as 100 officers from state, local, and federal agencies to patrol the dunes. In the ISDRA Business Plan, BLM anticipates incurring annual costs of up to \$3.12 million related to law enforcement (\$500,000), emergency (\$280,000), and additional holiday staffing (\$2.34 million). Portions of these costs have been identified by BLM as affiliated with PMV protective measures, including enforcing the 2001 closures and implementing a biological

monitoring plan for the plant, and are estimated in Section 4 as project modification costs (Exhibit 4-9) (BLM, March 1, 2004).

116. The Imperial County Sheriff's Office has also led a coalition of law enforcement agencies over the past three years to enforce legal behavior and provide for public safety at the dunes. In December 2003, the Sheriff's Office was granted approximately \$750,000 for OHV law enforcement and emergency services at the ISDRA by the California Off-Highway Motor Vehicle Recreation Commission.³¹
117. Any reduction in future visitation at the ISDRA is potentially associated with public costs savings in expenditures related to providing on-site infrastructure, enforcement, and emergency services at the dunes. However, data are not available to estimate the extent of these cost savings; as such, these cost savings are not monetized in this analysis.

³¹ California Off-Highway Motor Vehicle Recreation Commission, December 5, 2003 Minutes, accessed at <http://ohv.parks.ca.gov/pages/1140/files/Dec5Minutes.pdf>.

118. This chapter considers the economic impacts of actions taken to protect the PMV and its habitat. It quantifies the economic effects of the proposed CHD, as well as protective measures taken as a result of the listing or other Federal, State, and local laws that aid habitat conservation in the areas proposed for designation. First, it provides an estimate of impacts associated with species and habitat conservation efforts that were in place from the time of listing to final designation of critical habitat. Impacts associated with these management efforts are retrospective and may be on-going until the time of final designation. This analysis refers to these impacts as past impacts. Second, this chapter provides estimates of potential future impacts associated with the proposed CHD and other species and habitat conservation management efforts related to the PMV.
119. There is a great deal of uncertainty in estimating the impact of PMV-related management on future use of the ISDRA. Specifically, this analysis assumes that the outcome of future management decisions could range from no effects to complete closure of certain management areas. Alternatively, future consultations and other management actions could result in limitations on the number of users allowed within a given management area. Given uncertainty in the outcome of future consultations and other management actions, this analysis presents estimates of the potential economic contribution of each of the ISDRA management areas and that portion of each management area proposed for designation. These economic contribution estimates represent the upper bound impacts that could result from closure of these areas to OHV use in that:
- It is not possible to forecast with certainty whether critical habitat designation would result in closures of portions of the ISDRA. To the extent that closures do not occur, forecast impacts associated with lost OHV trips will not occur.
 - It is not possible, using existing data, to predict the percentage of OHV users who visit areas of the ISDRA that are proposed for critical habitat. Lacking detailed user data, this analysis assumes that visitation is evenly distributed within each management area. To the extent that areas proposed for designation are less popular with OHV users, this analysis could overstate impacts by overestimating the number of trips that could be affected by the designation. In fact, the Service has avoided designating many of the concentrated use areas in the ISDRA, in particular intensive OHV activity areas. The Service has avoided designating many major staging sites, campgrounds, and disturbed areas along roadways.

- It is not possible, using existing data, to model the OHV recreationist behavior in response to the closure of one or more management areas within the ISDRA. To the extent that acceptable substitute sites are available to these users, this analysis may overstate the consumer surplus impact of any closures.
120. In addition, this analysis uses information on past behavior of OHV recreators in response to past closures to gain insights for assessing impacts of ISDRA closures. In particular, the analysis applies this information to estimate potential consumer surplus and regional economic impacts associated with closures on a management area basis. However, as described in detail later in this section, these behavioral assumptions may not be appropriate to apply to all management areas.
121. Thus, even if the designation were to result in closures, future impacts could be lower than those estimated in the report. The analysis does assume that administrative and project modification costs will result from the designation, whether or not closures occur.
122. The impacts associated with past and potential future species and habitat management efforts are manifested in economic efficiency effects (i.e., social welfare) and distributional and regional impacts, as outlined below.

Efficiency Effects

- Reduced OHV Opportunities: Due to closures of certain ISDRA management areas, OHV users may have reduced recreational opportunities. OHV users will incur economic efficiency losses associated with this loss of access. Economic efficiency losses are social welfare losses often measured by changes in consumer surplus. Consumer surplus losses are calculated by estimating the number of lost OHV-related trips (i.e., user days) multiplied by the consumer surplus value of an OHV use day.
- Administrative Costs: Costs associated with engaging in section 7 consultation, including time spent attending meetings, preparing letters and biological assessments, and in the case of formal consultations, the development of a Biological Opinion by the Service are quantified as administrative costs. Section 7 consultation can require substantial administrative effort on the part of all participants. These impacts are measured as the cost of labor required to fulfill these managerial duties.
- Project Modification Costs: Species and habitat management efforts that involve project consultation activity are likely to result in project modifications in order to comply with the goals of the management efforts. In the course of complying with these management efforts, projects will incur costs of implementing these modifications. These costs are associated with changes in labor or material requirements that may occur at one point in time and/or be on-going.

Distributional and Regional Effects

- Regional Economic Impacts in OHV-Related Industries: Fewer OHV-related trips will result in reductions in OHV-related expenditures. These reduced expenditures are likely to affect income and employment in various OHV-related industries. Impacts to these industries will, in turn, result in indirect effects on the broader economy.

123. The remainder of this chapter discusses these economic impacts in detail. The first section discusses past impacts associated with species and habitat management efforts. This section includes a discussion of all the management efforts that have occurred since the time of the listing of the PMV and are expected to continue to occur through the time period when final designation is established. The second section discusses potential future impacts after the time of the final designation. These impacts are mainly associated with RAMP efforts. The third section presents a screening level analysis of the potential effects of proposed CHD on small entities (i.e., small businesses, small organizations, and small government jurisdictions)³² to satisfy the requirements of the Regulatory Flexibility Act as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996. Finally, pursuant to Executive Order No. 13211, the last section reports the potential impacts that proposed CHD is likely to have on the energy industry.

4.1 Past Impacts

124. Two significant conservation efforts that have provided habitat protection to the milk-vetch undertaken prior to proposed designation of critical habitat have had an impact on the local and regional economy. The first conservation effort providing habitat protection occurred in 1994, prior to the listing of the milk-vetch. The second conservation effort occurred in 2000, subsequent to the listing of the species in 1998.

125. These costs are quantified in this report and included in the summary of past and on-going efficiency effects presented in Exhibit ES-1.

- In 1994, the California Desert Protection Act designated the 26,202 acre North Algodones Dunes Wilderness Area to be managed by BLM as part of the National Wilderness Preservation System. The Wilderness Act of 1964 cites habitat characteristics as a key component for wilderness consideration. According to the Act, a wilderness area “contain(s) ecological, geological, or other features of scientific, educational, scenic, or historical value.”³³ To preserve the qualities of the North Algodones dunes, the area was closed to motorized vehicle use, but accessible by hiking and horseback riding (BLM, March 1, 2004). This closure had virtually no effect on OHV recreational visitation, as historically the North Algodones area had

³² Regulatory Flexibility Act, 5 U.S.C. 601 et. seq.

³³ Wilderness Act of 1964, 16 U.S.C. §§ 1131-1136

been classified under the 1980 California Desert Conservation Area Plan as a controlled area, with access generally limited to non-motorized means and as a wilderness study area (ASA, November 19, 2003). The 1994 wilderness designation did result in minimal project modification costs to BLM associated with patrolling wilderness boundaries to prevent the entry of motorized vehicles. These costs are quantified in this section.

- In 2000, a lawsuit filed against BLM resulted in two management actions: a temporary closure in the ISDRA and the development of a Recreational Activities Management Plan (RAMP). The closure temporarily banned OHV access to 49,310 acres of most of the Adaptive Management Area and parts of Mammoth Wash, Gecko, Glamis, Dune Buggy Flats, and Buttercup management areas to provide protection to the PMV. This closure will be lifted once the RAMP is implemented. The RAMP also proposes to limit visitation within the Adaptive Management Area to 525 vehicles per day during the visitation season (BLM, 2003d). This cap is only expected to play a role if it limits visitation beyond what BLM projects for this management area. While this may occur during high-use times, no data exist to support this. It is important to note that the Adaptive Management Area is remote and visited less frequently than other areas (BLM, 2003d).

This lawsuit resulted in conservation efforts having three types of economic impacts. First, similar to the costs associated with the CDPA, the lawsuit resulted in administrative and project modification costs associated with the closure. Second, this action resulted in a reduction in OHV use in closed areas. The reduction in OHV opportunities resulted in economic efficiency (i.e., consumer surplus) losses associated with lost OHV-related trips. Third, reductions in expenditures in OHV-related industries as a result of fewer OHV opportunities imposed economic impacts on the regional economy. These efficiency effects and distributional impacts are quantified in this section.

4.1.1 Past Management Actions and Associated Types of Economic Impacts

126. Past management actions within the ISDRA that have provided PMV protection are summarized below. For additional detail on past management and regulatory actions, see Appendix A.

BLM Monitoring for PMV (1979-current)

127. Prior to 1994, minimal conservation measures were taken to provide protection for the PMV. In 1977, a survey of sensitive plants within the ISDRA was conducted by WESTEC Services, Inc. In 1987 BLM implemented a RAMP which included a monitoring system proposed for 15 animals and plant species, including the PMV (BLM, Knauf & Hamada, October 2003). After the PMV was listed as threatened in 1998, BLM expanded its monitoring efforts for PMV by monitoring on an annual basis for the plant.

1994 Designation of North Algodones as Wilderness Area

128. In 1994, the California Desert Protection Act designated the 26,202 acre North Algodones Dunes as a Wilderness Area due, in part, to the ecological qualities of the region. To maintain the dunes as wilderness, the area was closed to motorized vehicle use but open to non-motorized recreation such as hiking and horseback riding. This wilderness area designation resulted in both administrative and project modification costs to BLM. Project modification costs associated with this management action include:

- Installation of signs prohibiting OHV use; and
- Enforcement via patrolling to prevent entry of motorized vehicles into wilderness boundaries.

129. Economic impacts associated with reduced OHV opportunities (i.e., social welfare and regional economic impacts) are not an issue with this management action. This management area had historically been designated as a limited use area, and OHV use was not previously permitted in the region. Accordingly, impacts associated with OHV use would be associated with illegal use and are not quantified in this analysis.

2000 BLM Lawsuit

130. A lawsuit in 2000 against BLM resulted in the temporary closure of 49,310 acres within the ISDRA, including portions of Buttercup Valley, Gecko Area, and most of Adaptive Management Area, to provide protection to PMV and desert tortoise habitat. This management action resulted in both administrative and project modification costs to BLM. Project modification costs include:

- Installation of signs prohibiting OHV use; and
- Enforcement of closed areas via patrolling.

131. These temporary closures reduced the number of acres available to OHV users by 30 percent. Based on available information, this analysis concludes that the reduction in access led to a reduction in consumer surplus and regional economic impacts.

132. Portions of the closures are located in more remote areas (e.g. the Adaptive Management area) and were historically visited less intensively than other areas of the ISDRA (BLM, 2003d). According to OHV groups, these areas were visited by users seeking a less crowded dune experience (ASA, November 19, 2003). In the years subsequent to the closures, BLM and OHV groups have noted two changes in ISDRA use patterns. First, open areas adjacent to the closures (such as the southern dunes and the east side of Ogilby) have accommodated displaced users and experienced increased visitation. Second, BLM has documented an increase in visitation during traditionally off-peak weekends, likely a result

of OHV recreationists seeking a less-crowded ISDRA experience (BLM, November 20, 2003).³⁴

133. Whether visitation to the ISDRA declined as a result of the closures is debated. OHV groups believe fewer OHV-related trips were taken to the ISDRA in the year subsequent to the closures (ASA, November 9, 2003). BLM indicates that visitation declines due to closures were likely minimal (BLM, Knauf and Hamada, October 17, 2003).

Production of EIS/RAMP and Section 7 Consultation on Management of ISDRA

134. The lawsuit in 2000 resulted in the production of an Environmental Impact Statement (EIS) and RAMP for managing the ISDRA. The RAMP proposes to retain the 1994 Northern Algodones Dunes as closed to motorized vehicle use and to reopen the 2000 temporary closures, but with a cap of 525 vehicles per day in the Adaptive Management Area.
135. The production of the EIS and RAMP triggered section 7 consultation with the Service. In 2003, the Service issued a Biological Opinion on the RAMP, wherein BLM proposed to increase the precision of its monitoring plan, fund and implement studies to answer questions regarding effects of OHV use on the PMV, and reinitiate consultation under one of two scenarios: PMV populations were found to be below current levels or within four years. The production of the EIS and RAMP, and the formal section 7 consultation with the Service, resulted in significant administrative costs to both the Service and BLM. While project modifications have been proposed within the Biological Opinion for this consultation, they will be carried out once the RAMP is implemented.

Other Past BLM Section 7 Consultation Activity

136. Other previous PMV management actions that have resulted in economic impacts include additional section 7 consultation activity on various projects and ongoing activities that occur within the ISDRA. These activities include film production and utilities construction. With the exception of the formal consultation on the management of the ISDRA, past consultation activity for the PMV has been informal. These consultations have resulted in a minimal level of administrative and project modifications costs (Service, October 16, 2003; BLM, Knauf and Hamada, October 17, 2003).

4.1.2 Administrative Costs

137. Section 7 consultation costs include the administrative costs associated with conducting the consultation, such as the cost of time spent in meetings, preparing letters, and

³⁴ A decline in visitation during heavily used weekends (e.g. Thanksgiving) may also be attributed to the increased levels of enforcement during those weekends (BLM, November 20, 2003).

in some cases, developing a Biological Opinion. Estimates of per-effort costs associated with informal and formal consultations are presented in Exhibit 4-1. Unless otherwise stated, this table is used to develop total administrative costs for consultations associated with activities within the proposed CHD for the PMV.

Exhibit 4-1 ESTIMATED ADMINISTRATIVE COSTS OF CONSULTATION AND TECHNICAL ASSISTANCE EFFORTS FOR PMV (PER EFFORT)^a			
Critical Habitat Impact	Scenario	Service	Action Agency
Informal Consultation	Low	\$1,000	\$1,300
	High	\$3,100	\$3,900
Formal Consultation	Low	\$3,100	\$3,900
	High	\$6,100	\$6,500
^a Low and high estimates primarily reflect variations in staff wages and time involvement by staff. Sources: IEC analysis based on data from the Federal Government General Schedule Rates, Office of Personnel Management, a review of consultation records from several Service field offices across the country, and communications with Biologists in the Service and personnel from the BLM Lander Field Office.			

138. The number of past consultation efforts for the PMV has been minimal, with only one formal consultation initiated since the listing of the species in 1998. This formal consultation, on the BLM's management of the ISDRA, occurred over a period of two years and required a significant level of administrative effort from both the Service and BLM.

- The Service has noted that engaging in this formal consultation and preparing a Biological Opinion involved a higher level of administrative effort (Service, October 16, 2003). This analysis therefore estimates these and other Service-related consultation costs (e.g., attending meetings and writing letters) to be \$6,100.
- Administrative efforts spent by BLM include preparing information and attending meetings for this consultation. In addition, BLM undertook significant administrative effort associated with engaging in the formal section 7 consultation and preparing and revising an EIS and RAMP, the development of which were prompted by the 2000 lawsuit and the presence of the PMV. BLM indicate that, in total, the cost of development of the EIS and RAMP was up to \$1 million (BLM, Knauf and Hamada, October 17, 2003).³⁵ In the past, BLM has engaged in a minimal amount of consultation with the Service on various activities and projects with the

³⁵ The high estimate for administrative costs borne by BLM are attributable to the number of staff involved in the production of the EIS and RAMP. BLM notes that the production of the EIS and RAMP involved nine personnel from the El Centro office and approximately 15 employees from the California State Office over a period of two years (Knauf & Hamada, October 2003).

potential to impact the PMV. The administrative costs associated with these consultations have involved a low level of effort and are estimated to be minimal (BLM, Knauf & Hamada, October 17, 2003).

139. Total past costs associated with administrative efforts in past consultations are Approximately \$1.08 million at a seven percent discount rate (Exhibit 4-6). These administrative costs were incurred between 2001 and 2003.

4.1.3 Project Modification Costs

140. The BLM has borne the bulk of costs associated with implementing project modifications that benefit and protect the PMV and its habitat (BLM, Knauf and Hamada, October 17, 2003). These costs include monitoring costs, the costs of implementing and maintaining signs, and enforcement costs associated with patrolling closed areas. Based on data and assumptions provided by BLM (BLM, Knauf and Hamada, October 17, 2003), total costs associated with past project modifications are estimated to average approximately \$384,000 per year. These costs were incurred in the years subsequent to the 2000 lawsuit. This analysis assumes that these annual project modification costs are associated with the time period between 2000 and 2003. The present value of total past costs associated with project modifications is estimated at \$3.14 million (Exhibit 4-6).

4.1.4 Reduced OHV Opportunities

141. This analysis assumes that past management actions to protect the PMV resulted in a 15 percent decline in total OHV trips taken, at the upper bound, from 2001 to 2004.³⁶ The temporary closure of 49,310 acres of the ISDRA reduced the number of acres available to OHV users by 37 percent. While detailed visitation data are not available to describe the effects of the closure, BLM data indicate that visitation dropped from 247,929 in the 2000 season to 187,557 in the 2001 season, or by 24 percent.³⁷ As noted in Section 3, prior to 2002 BLM did not collect visitation information by management area; as such, it is not possible to identify which management areas received fewer visitors as a result of the closure. In addition, this drop in visitation may reflect a variety of factors, outside of the closure. BLM has noted that visitation to the dunes often is subject to fluctuation based on economic and weather conditions (BLM, Knauf and Hamada, October 17, 2003). OHV groups believe the closure may have impacted visitation by as much as 15 percent in the year subsequent to the closures (ASA, November 19, 2003). Discussions with OHV groups indicate that users may have been temporarily discouraged by the news of the closures. BLM indicates that this

³⁶ Trip estimates reflect those taken by OHV use parties (i.e., all individuals in a vehicle) to the management areas.

³⁷ The 2000 season reflects visitation from October, 1999 to May, 2000.

closure likely had a minimal impact on visitation (BLM, Knauf and Hamada, October 17, 2003).

142. To estimate the consumer surplus loss associated with these lost OHV trips, this analysis uses a benefits transfer approach. Benefits transfer involves adapting research conducted to estimate economic values under one set of circumstances to address a new policy question. In this manner, existing valuation research is combined with site-specific data and information to develop a “transferred” estimate. Benefits transfer has been widely applied in policy analysis and is approved for use within the Department of the Interior guidelines for natural resource damage assessment under CERCLA. In this case, existing estimates of consumer surplus value for OHV recreation are applied with estimates of the number of trips to the ISDRA to estimate changes in consumer surplus losses.
143. Best practice in the conduct of benefits transfer generally involves five steps (U.S. Environmental Protection Agency guidelines for preparing economic analyses describe these steps in more detail) (EPA, 2000):
- 1) **Describe conditions to be valued:** Identify and describe in detail the valuation scenario, which in this case involves the nature and extent of OHV opportunities at the ISDRA, the nature and extent of management restrictions present, and the manner in which the management restrictions have affected OHV user behavior.
 - 2) **Identify relevant research:** Conduct a detailed search for relevant research.
 - 3) **Review research for quality and applicability:** Review relevant research carefully for quality and specific applicability.
 - 4) **Transfer of economic values:** Apply the valuation information identified to the conditions being valued; in this case, to estimated changes in welfare associated with use restrictions on OHV activity in the ISDRA.
 - 5) **Address uncertainty:** Evaluate assumptions made in the process of transferring economic values and the sensitivity of final damage estimates to such assumptions.
144. A significant aspect of the first step involves describing the nature of OHV use, use restrictions, and behavioral response at the ISDRA, as summarized in preceding discussions. Next, to conduct the benefits transfer, relevant research on the extent of OHV visitation reductions and OHV trips values needs to be identified.
145. To estimate the extent of OHV-user losses in the ISDRA due to regulatory closures, this analysis assumes that the 15 percent use reduction applies for all years of the closure. The closure began in 2001, and is assumed to be lifted at the end of 2004. While this might overstate the consumer surplus losses, information indicating when and if OHV use of these

areas returned to pre-closure visitation levels is not available. Applying the 15 percent use reduction estimate to visitation levels in 2000 results in a loss of 37,189 trips each year. Assuming that these trips were lost each year and that closures would be lifted at the end of 2004, approximately 148,757 trips were lost between 2001 and 2004.

146. To estimate the consumer surplus value of an OHV trip, this analysis obtained relevant studies from the economics valuation literature. The analysis assumes that under closures, OHV-users who would otherwise recreate at the closed ISDRA management areas would choose to not participate in this activity. As such, the surplus estimates used in this analysis reflect the marginal value of a day spent in OHV recreation. Data do not exist to allow for development of a model of ISDRA visitor behavior given closure of one or more of the management areas. For example, given closure of one area, users might simply substitute to other areas of the ISDRA, or to another OHV location in the region. However, such changes in behavior might involve a loss in surplus to the user (associated with a change away from their preferred location), and a loss in surplus to other users due to congestion. Given the absence of detailed data for this site, this analysis presents an upper-bound impact estimate, reflecting the loss in surplus value (or regional economic contribution) that might result from the closure of the areas associated with the BLM lawsuit. In particular, this analysis can be used to understand the upper-bound social welfare and regional economic impacts of a closure of most of the Adaptive Management Area.
147. Two relevant studies in the economic valuation literature provides estimates for OHV use values. First, Englin, et. al (2003) estimate welfare of OHV use at four recreational sites in western North Carolina. This study provides per person OHV values that vary with the recreational site ranging from approximately \$27 per trip to \$132 per trip. Second, Jakus (2003) estimate welfare values for OHV use in the State of Utah. This study reports that consumer surplus values per person range from approximately \$50 per day to \$58 per day (2003 dollars). On a per-trip basis, assuming two days per trip, the Jakus study surplus estimates range from approximately \$96 per trip to \$110 per trip, per person. A review of these studies indicates that they are highly applicable for transfer. OHV users of the ISDRA are broadly similar to the ATV users in the two studies (Exhibit 4-2). In addition, the studies appear to represent a high-quality travel cost approach to estimating values. Following standard procedures, the authors calculate travel cost using well-accepted assumptions about the opportunity cost of time, and exclude inappropriate expenditures such as the cost of lodging and capital equipment.

Exhibit 4-2			
COMPARISON OF OHV LITERATURE SAMPLE CHARACTERISTICS AND ISDRA USERS*			
Characteristic	Jakus (2003)	Englin, et. al (2003)	ISDRA User
Location	Utah	North Carolina	California
Welfare Estimate	\$50-\$58/day per person	\$27-\$132/trip per person	--
Visits per year	13.9 visits per year (69% of sample less than 10 visits per year)	6 trips per year, on average	3 trips per year, on average
Trip length	1 day	1 ½ - 2 days per trip	1 - 3 nights per trip
OHV users per family	2.7	2.78	3.2 (State of California, OHV users)
Vehicle type	ATV	ATV, Four-Wheel Drive, Trail Bike	ATV, Dunebuggy, Four- Wheel Drive
Mean trip expenditure	Not Available	\$454, on average. Ranges from \$270 - \$679, depending on site.	\$250 - \$500
Gender	61 percent male	90 percent male	Majority are male
Age	43 years old (median)	34 years old	18 - 30 years old
Education level	Not Available	13 years	Not Available
Median Income	Not Available	\$52,000	Not Available
Cost of last OHV purchase	Not Available	\$6,900	California OHV residents spent approximately \$5,000 on dunebuggies in 1993.
Sources: Englin, et. al (2003); Jakus (2003); BLM (2003c); ASA (November 19, 2003; November 20, 2003); ORBA (November 21, 2003); BLM (Knauf and Hamada, October 17, 2003).			

148. To provide some understanding of how these value estimates compare with values for other, more general off-road driving activity values, the broader valuation literature was reviewed. This review indicated that other valuation studies of off-road driving activities involve similar consumer surplus values. In particular, Rosenberger and Loomis (2000) provide a published summary of net economic values per recreation day for a variety of types of recreation including "off-road driving." This study is an update of a previous national study of outdoor recreation values (Walsh, et al., 1992). Their summary includes information from 131 outdoor recreation demand studies and provides value estimates for 21 different categories of benefits. The summarized studies use a variety of methodologies, including travel cost and contingent valuation models. The authors estimate the average value for a day

of off-road driving to be approximately \$37 per person (2003 dollars) on the Pacific Coast, and approximately \$22 per person (2003 dollars) nationally. Because these studies reflect off-road activities in a broad geographic area, this analysis assumes that these values represent average quality recreational resources. As such, we would expect these values to cover a range of estimates that are lower than the value of a day of OHV use at the ISDRA.

149. This analysis uses the upper end of the Englin study (\$132 per trip per person) to value OHV use in the ISDRA. It is expected that the value of OHV use at the ISDRA would be at least that which was presented in this study for a number of reasons. First, the per-trip per-person value estimate likely underestimates the value of trips taken to the ISDRA. Second, the sites surveyed in the Englin, et. al study reflect sites that are less unique than the sand dunes of Southern California. These sites reflect over 100 miles of forested areas available to all-terrain vehicles, dirt bikes, and four-wheel drive vehicles.³⁸ In addition, the NC OHV sites have several substitute opportunities that are in close proximity to each other, relative to the dune-based OHV sites in California. Moreover, this estimate reflects a per-person consumer surplus value applied to an estimate of per-party OHV trips. The existing literature does not provide guidance on how to address issues related to this, including accounting for children in the vehicle, and determining how to allocate expenses (and value) across individuals in a group.
150. Using these data, the total present value of lost OHV opportunities occurring between 2001 and 2004 is approximately \$20.37 million at a seven percent discount rate (2003 dollars). Total past efficiency effects associated with lost OHV opportunities are presented in Exhibit 4-6. On an annual basis, these consumer surplus impacts are approximately \$5.09 million per year during the closure period (2001 to 2004). While these closures are potentially associated with cost savings to public agencies, local communities, and health and safety service providers, these cost savings are not monetized.

4.1.5 Regional Economic Impacts

151. A reduction in OHV recreational trips to the ISDRA is likely to lead to a reduction in expenditures in OHV-related industries, thus having an economic impact the regions where the bulk of the OHV expenditures occur. As mentioned in Chapter 3, the bulk of expenditures made by recreationists, in terms of consumable goods, occur in Imperial and Yuma Counties. These two counties benefit from the hundreds of thousands of visitors who come annually to the ISDRA and incur significant trip-related expenditures within Imperial and Yuma Counties.
152. The reductions in expenditures associated with past ISDRA closures likely affected the Imperial and Yuma county economies in a number of ways, primarily through decreased fuel, food, camping supplies, medical goods and services sales and equipment repairs.

³⁸ Website: <http://ncnatural.com/NCUSFS/orv.html>

Decreased expenditures in these industries would also result in secondary effects on related sectors in Imperial and Yuma Counties. Some of these related sectors may be closely associated with the OHV industry, such as sporting good industries; however, some sectors may be less closely associated with the OHV industry, such as the food service industry.

153. This analysis relies on regional economic modeling to estimate the economic impacts of these initial and secondary effects. In particular, it utilizes a software package called IMPLAN to estimate the total economic effects of the reduction in economic activity in the OHV-related industries in Imperial and Yuma Counties associated with the ISDRA closures. IMPLAN is commonly used by state and Federal agencies for policy planning and evaluation purposes. The model draws upon data from several Federal and state agencies, including the Bureau of Economic Analysis and the Bureau of Labor Statistics.
154. IMPLAN translates initial changes in expenditures into changes in demand for inputs to affected industries. These effects can be described as direct, indirect, or induced, depending on the nature of the change.
- *Direct effects* represent changes in output attributable to a change in demand or a supply shock. These are specified initially by the modeler (e.g., the change in recreation expenditures on goods and services, by sector).
 - *Indirect effects* are changes in output of industries that supply goods and services to those that are directly affected by the initial change in expenditures.
 - *Induced effects* reflect changes in household consumption, arising from changes in employment (which in turn are the result of direct and indirect effects). For example, changes in employment in a region may affect the consumption of certain goods and services.
155. These categories are calculated for all industries and aggregated to determine the regional economic impact of reduced OHV-related expenditures associated with these PMV-related management actions.
156. There are two important caveats relevant to the interpretation of IMPLAN model estimates, generally, and within the context of this analysis. The first is that the model is static in nature and measures only those effects resulting from a specific policy change (or the functional equivalent specified by the modeler) at one point in time. Thus, IMPLAN does not account for posterior adjustments that may occur, such as the subsequent re-employment of workers displaced by the original policy change. In this analysis, this caveat suggests that the long-run net output and employment effects resulting from changes in ISDRA use regulations are likely to be smaller than those estimated in the model, which will lead to an upward bias in the estimates. A second caveat to the IMPLAN analyses is related to the model data. The IMPLAN analysis relies upon input/output relationships derived from 1998 data. Thus, this analysis assumes that this characterization of the Imperial and Yuma County economies are

a reasonable approximation of current conditions. If significant changes have occurred in the structure of the economies of these two counties, the results may be sensitive to this assumption. However, the magnitude and direction of any such bias are unknown.

157. To estimate the regional economic impact of lost OHV trips, the analysis relies on information on the total number of trips lost due to the closure and an estimate of the expenditures made per OHV-related trip.

- **Lost OHV Trips:** As noted in Section 4.1.4, this analysis assumes that the ISDRA experienced a loss of 15 percent of OHV-related trips. BLM visitation data indicate that in the year prior to the closures a total of 247,929 trips were made to the ISDRA. Applying this 15 percent use reduction to 2000 visitation estimate, we estimate that the closure resulted in a loss of 37,189 trips each year.³⁹

Approximately 85 percent of the lost trips reflect visitors from California and 15 percent of lost trips reflect visitors from Arizona (BLM, 2003b; BLM, 2003c). Based on available information, this analysis concludes that the 85 percent of lost trips reflecting visitors from California make OHV-related purchases in Imperial County, and the remaining 15 percent of lost trips reflecting visitors from Arizona make OHV-related purchases in Yuma county.

- **Expenditures per Trip:** Estimates for average expenditures per OHV-recreation trip are based on a number of sources: California Department of State Parks and Recreation (CA DSPR), American Sand Association (ASA), and other OHV groups representing ISDRA recreation, including the Off Road Business Association. As provided in Exhibit 4-3, this analysis estimates ISDRA-related trip expenditures to range from \$250 to \$500 per trip (per vehicle) for past and on-going losses (2003 dollars).
 - ▶ The American Sand Association and other related groups, including the Off Road Business Association report that OHV expenditures for recreating in the ISDRA range can from \$250 to \$500 per trip (ASA, November 20, 2003). These sources also indicate that these trip expenditures reflect what is spent in Imperial and Yuma counties. However, these sources do not provide this information by expenditure type.
 - ▶ The CA DSPR conducted a study in 1993 on OHV use in California (CA DSPR, 1993) surveying OHV households on OHV-related expenditures, including food, transportation, and supplies. The respondents surveyed represent users of a wide variety of vehicle types, including dune buggies, snowmobiles, four-wheel drive vehicles, motorcycles, among other vehicles used for off-road use. The study indicates that expenditures for food,

³⁹ Trip estimates reflect those taken by OHV use parties (i.e., all individuals in a vehicle) to the management areas.

equipment, transportation, medical and lodging industries are approximately \$714.11 per trip (2003 dollars).⁴⁰ The trip expenditures the study gathered represent average expenditures for all categories of off-road vehicle use. That is, OHV expenditures for off-road recreating in sand dunes is not provided distinctly from other off-road uses (e.g., snowmobiling). In addition, this report does not attempt to distinguish between trip-related goods and services purchases regionally and from where users originate.

- Applying CA DSPR and BLM data to the expenditure information provided by the OHV groups, this analysis calculates an allocation of total trip expenditures by expenditure category. First, BLM data indicate that in the past, visitation fees in the ISDRA were \$10 per week (BLM, March 1 , 2004). This expenditure amount reflects the fee that has been in place in the ISDRA from 2001 to 2004. Second, the CA DSPR data provides the distribution of expenditures by expenditure type. The analysis applies this distribution to the \$250 to \$500 per trip range to estimate OHV-related expenditures (Exhibit 4-3).

Exhibit 4-3 OHV-RELATED EXPENDITURES (2003 dollars)		
Expenditure Category	OHV Trip Expenditures	
	Low Expenditure Estimate	High Expenditure Estimate
Groceries, Food, and Drinks	\$117.80	\$240.50
OHV Equipment, Supplies and Services	\$95.32	\$194.60
Medical Supplies and Treatment	\$8.67	\$17.70
Visitation Fees (including lodging)	\$10.00	\$10.00
Transportation (including fuel)	\$18.26	\$37.30
Total	\$250	\$500

158. The total decrease in expenditures in each industry in 2004 due to the reduction in OHV trips is calculated by multiplying the average per-trip expenditures by the number of trips not taken each year, by county (Exhibit 4-4).

⁴⁰ This expenditure estimate excludes what the study reports as "Non-OHV Travel Expenses," totaling \$237.50 (2003 dollars). It is unclear what industry category these expenses are associated with and what they comprise.

Exhibit 4-4 TOTAL REDUCTION IN OHV-RELATED EXPENDITURES FROM PAST ISDRA CLOSURES* (Millions of 2003 Dollars)				
Expenditure Category	Imperial County		Yuma County	
	Low	High	Low	High
Groceries, Food, and Drinks	\$3.72	\$7.60	\$0.66	\$1.34
OHV Equipment, Supplies and Services	\$3.01	\$6.15	\$0.53	\$1.09
Medical Supplies and Treatment	\$0.27	\$0.56	\$0.05	\$0.10
Camping Fees	\$0.32	\$0.32	\$0.06	\$0.06
Transportation (including fuel)	\$0.58	\$1.18	\$0.10	\$0.21
Total	\$7.90	\$15.81	\$1.40	\$2.79
* The range of total expenditure reductions reflects high and low estimates of trip expenditures based on a number of sources: California Department of State Parks and Recreation, American Sand Association, and other OHV groups representing ISDRA recreation, including the Off-Road Business Association.				

159. The estimated regional economic impact of a loss of 37,189 trips in year 2004 ranges from approximately \$13 million to \$26 million (Exhibit 4-5). The economic impact to Imperial County is estimated to range from \$11.0 million to \$22.0 million, while the impact to Yuma County is estimated to range from \$2.0 million to \$4.0 million. The loss of 37,189 trips is also estimated to impact as many as 527 jobs, with a loss of 443 jobs in Imperial and a loss of 84 jobs within Yuma County, at the high end. The loss in trips may also impact taxes by as much as \$1.46 million in Imperial and \$260,000 in Yuma County. The estimates of these regional economic impacts represent snapshots of the changes in revenues, jobs and local taxes that may have resulted from closure of the various management areas to OHV use. These impacts would occur once (say, in 2004), and would persist for some period of time until the economy adjusts to the change. Thus, these are not annual impact estimates (as are the surplus measures that are presented), but one-time changes in economic activity levels. The estimates calculated in this analysis reflect impacts in year 2004.

Exhibit 4-5 REGIONAL ECONOMIC IMPACT OF PAST ISDRA CLOSURES IN YEAR 2004* <u>Imperial and Yuma Counties</u> (millions of 2003 dollars)								
County	Direct Effect (Employment)		Indirect Effect (Employment)		Induced Effect (Employment)		Total Impact (Employment)	
	Low	High	Low	High	Low	High	Low	High
Imperial	\$7.91 (185)	\$15.81 (360)	\$1.36 (16)	\$2.71 (33)	\$1.75 (26)	\$3.49 (51)	\$11.01 (227)	\$22.00 (443)
Yuma	\$1.40 (33)	\$2.79 (65)	\$0.28 (4)	\$0.56 (8)	\$0.31 (5)	\$0.62 (11)	\$1.99 (42)	\$3.97 (84)
TOTAL	\$9.31 (218)	\$18.60 (425)	\$1.64 (21)	\$3.27 (41)	\$2.06 (31)	\$4.11 (62)	\$12.99 (269)	\$25.97 (527)
* Regional economic impact measures represent one-time changes in economic activity, measured in the year reported. * The range of impact estimates reflects high and low estimates of trip expenditures based on a number of sources: California Department of State Parks and Recreation, American Sand Association, and other OHV groups representing ISDRA recreation, including the Off-Road Business Association.								

4.1.6 Summary of Past Impacts

160. The economic efficiency effects associated with management efforts having past impacts are approximately \$25 million since the listing of the PMV in 1998. On an annual basis, these impacts are approximately \$4.1 million per year from 1998 to 2004. As Exhibit 4-6 shows, the bulk of these impacts are associated with reduced OHV opportunities.

Exhibit 4-6 PAST EFFICIENCY EFFECTS ASSOCIATED WITH LISTING AND OTHER PROTECTIVE MEASURES: 1998 - 2004 (millions of 2003 dollars, 7% discount rate)*			
Consumer Surplus (Reduced OHV opportunities) (2003 Dollars)	Administrative Costs	Project Modification Costs	TOTAL
\$20.37	\$1.08	\$3.14	\$24.59
Annualized (1998-2004):			\$4.1
* Efficiency effects are estimated using a discount rate of three percent in Appendix C.			

161. The regional economic impact of past ISDRA closures in year 2004 ranges from \$11.0 million to \$22.0 million in Imperial County and \$2 million to \$4 million in Yuma County (2003 dollars). This range reflects a range of assumed per-trip expenditures. This regional impact is associated with up to 443 jobs and \$1.46 million in taxes in Imperial County and up to 84 jobs and \$260,000 taxes in Yuma County. As Exhibit 4-7 shows, the bulk of these impacts have occurred in Imperial County.

Exhibit 4-7				
ANNUAL REGIONAL ECONOMIC IMPACTS ASSOCIATED WITH PAST ISDRA CLOSURES*				
(millions of 2003 dollars)				
Category	Imperial County		Yuma County	
	Low	High	Low	High
Revenue	\$11.01	\$22.00	\$1.99	\$3.97
Employment (jobs)	227	443	42	84
Taxes	\$0.73	\$1.46	\$0.13	\$0.26
*Low and high impact estimates reflect two estimates of trip expenditures based on a number of sources: California Department of State Parks and Recreation, American Sand Association, and other OHV groups representing ISDRA recreation, including the Off-Road Business Association.				

162. Exhibit 4-8 presents the key assumptions of the economic analysis, as well as the potential direction and relative scale of bias introduced by these assumptions.

Exhibit 4-8 CAVEATS TO THE ECONOMIC ANALYSIS OF PAST IMPACTS	
Key Assumption	Effect on Impact Estimate
The analysis does not account for losses associated with a reduced quality of experience for users who continued to take OHV trips to the ISDRA. OHV users who, prior to the closure, recreated in the closure area may have either chosen not to recreate within the ISDRA or to continue to recreate but at another location within the ISDRA. While the analysis accounts for impacts of the former category of users, it does not account for the latter.	-
The analysis does not account for impacts associated with the one percent of proposed CHD that resides outside the ISDRA.	-
This analysis applies per-person consumer surplus estimates and per-party OHV trips estimates to generate consumer surplus losses and contributions.	-
The IMPLAN model that is used to estimate regional economic impacts is a static model and does not account for the fact that the economy will adjust. IMPLAN measures the effects of a specific policy change at one point in time. Over the long-run, the economic losses predicted by the model may be overstated as adjustments such as re-employment of displaced employees occurs.	+
The analysis does not account for other activities that might be taking place in the ISDRA closure areas to mitigate the consumer surplus impact. For example, the BLM lawsuit closures may have resulted in additional non-vehicular use of the areas. Individuals may have chosen to participate in a variety of activities, such as hiking, camping, and scenic vista appreciation, thus potentially resulting in increased consumer surplus and regional economic impacts associated with these activities.	+
The analysis assumes that some OHV users refrain from OHV use as a result of the closures for the entire time period of the closures. However, there is no model available to estimate OHV-users' responses to a change in access to certain ISDRA areas.	+
The analysis utilizes the best available data from previous studies, not data gathered through original research.	+/-
The IMPLAN model that is used to estimate regional economic impacts relies on 1998 data. If significant changes have occurred in the structure of Imperial and Yuma Counties economy, the results may be sensitive to this assumption. The direction of any bias is unknown.	+/-
- : This assumption may result in an underestimate of real costs. + : This assumption may result in an overestimate of real costs. +/- : This assumption has an unknown effect on estimates.	

4.2 Potential Future Impacts

163. This section attempts to predict costs that could occur after the designation is finalized. It discusses future management actions involving species and habitat protection, including a discussion of the types of economic impacts associated with each component of

these management actions. In particular, this analysis assumes that the RAMP will be implemented at the end of 2004. Because the outcome of future section 7 consultations associated with implementation of the RAMP are uncertain, this economic analysis provides a range of economic estimates that could be used to understand the impact of a variety of potential future regulatory outcomes.

4.2.1 Management Actions and Associated Types of Economic Impacts

164. Economic impacts related to PMV management actions are anticipated to result from the implementation of BLM's RAMP and the project modifications recommended by the Service in its biological opinion. Other impacts may stem from any change in the management of the ISDRA that limits use of the area by recreationists or future section 7 consultation activity associated with the PMV and its proposed CHD. Potential future management actions implemented provide PMV protection are discussed below.

RAMP Implementation

165. Implementation of the RAMP is projected to generate a variety of project modification costs. In the 2003 Biological Opinion on the management of the ISDRA, BLM proposes to increase the precision of its proposed monitoring plan, fund and implement studies to answer questions regarding the effects of OHV use on PMV, and use information from the next four years of monitoring to develop an adaptive management program for the PMV. BLM's 2003 RAMP also proposes to reopen the 2000 temporary closures but limit visitation within the Adaptive Management Area to 525 vehicles per day. To implement these management actions and other project modifications specified in the biological opinion, BLM is anticipated to incur significant costs associated with the following cost categories: permit program, biological monitoring plan, business plan, law enforcement, interpretive areas, property signage, and outreach.
166. To fund part or all of these management actions and project modifications, BLM increased its visitation fee in October of 2003 from \$10 to \$25 per week (or from \$30 to \$90 per season). This visitation fee includes the cost of lodging (i.e., camping) in the area. While the new fee increases the burden on ISDRA users, it is not anticipated to discourage OHV users from visiting the ISDRA. According to OHV group representatives, BLM's new fee is comparable to fees for other OHV areas within Southern California (ASA, November 19, 2003). BLM's ISDRA Business Plan also notes that the new fee is comparable to fees charged by the Forest Service, National Park Service, and other California OHV recreation areas (BLM, 2003c). While this fee increase may reduce the total consumer surplus accrued to users, the magnitude of the impact cannot be estimated without primary data and modeling. Specifically, the effect of an increase in the fee charged on consumer surplus at one recreation

site such as this is dependent on a number of factors, such as availability and characteristics of substitute sites and the geographic distribution of visitors.

167. Implementing the RAMP and project modifications are not anticipated to result in reduced OHV opportunities or adverse regional economic impacts. First, the reopening of the 2000 temporary closures may serve to increase OHV opportunities back to pre-closure levels. Second, the imposition of a cap of 525 vehicles per day within the Adaptive Management Area is not anticipated to have significant impacts. This cap is expected to play a role if it limits visitation beyond what BLM projects for this management area. While this may occur during high-use times, no data exist to support this. It is important to note that the Adaptive Management Area is remote and visited less frequently than other areas (BLM, 2003d).

Reinitiation of Section 7 Consultation on RAMP with BLM

168. In the 2003 Biological Opinion, BLM proposes to reinitiate consultation with the Service in four years based on information obtained from monitoring and studies or sooner than four years if the PMV population in any Management Area falls to 50 percent of the baseline level in a subsequent year with comparable rainfall at or above the long-term mean (Service, 2003). While this future consultation has the potential to result in additional management actions, no project modifications are currently anticipated that would reduce OHV opportunities or adversely impact the regional economy (Service, October 16, 2003; BLM, Knauf and Hamada, October 17, 2003). This analysis assumes this consultation will result solely in administrative costs.

Section 7 Consultation Activity Unrelated to RAMP

169. Future activities within the ISDRA that may adversely impact the PMV and its proposed CHD may trigger section 7 consultation with the Service. These activities include utilities construction and maintenance, commercial film activities, and canal construction and maintenance. As the majority of the land proposed to be designated is used primarily for recreation, this analysis anticipates minimal consultation efforts regarding other non-recreational activities and projects. While future section 7 efforts may involve administrative costs and costs associated with implementing project modifications, data do not currently exist to quantify these costs. As such, this analysis does not estimate the extent of these potential future costs.

RAMP: Changes in permissible activities within BLM Management Areas

170. Future management actions by BLM may be implemented to provide protection to PMV and its habitat. As stipulated in the ISDRA Business Plan, if visitation thresholds are exceeded, BLM faces the implementation of additional management actions, including limiting the number of users in the ISDRA, to ensure that natural resources are adequately protected. Thus, future changes in BLM's management of the dunes could result in reduced OHV opportunities and regional economic impacts in addition to posing project modification costs to the BLM.

4.2.2 Administrative Costs

171. Estimates of the administrative costs associated with re-initiation of a section 7 consultation on the RAMP with BLM were developed. This analysis assumes that a formal consultation will result in costs to the Service of up to \$6,100, and to BLM of up to \$15,300, for a total of \$21,400. The present value of these administrative costs totals \$17,500 and is expected to occur in 2008. While re-initiation of the consultation may occur before that time due to a decline in the population of the PMV to levels specified in the biological opinion, this analysis assumes these costs would be incurred in four years.

4.2.3 Project Modification Costs

172. BLM has identified numerous planned action items in the 2003 ISDRA Business Plan associated with the implementation of the RAMP. According to BLM, a portion of these planned actions listed in the Business Plan are affiliated with PMV protective measures, and include enforcing closed areas and implementing a biological monitoring plan. (BLM, Knauf and Hamada, October 17, 2003). The total project modification costs related to the PMV that are associated with a variety of planned actions are described in Exhibit 4-9 below (BLM, 2003c). Assuming that the cost of these actions begin in the year of RAMP implementation and continue, evenly distributed, over the next ten years, the total present value estimated cost of implementing these actions is approximately \$11.36 million (seven percent discount rate), or approximately \$1.14 million per year.

Exhibit 4-9 RAMP AND BIOLOGICAL OPINION MANAGEMENT ACTIONS RELATED TO PMV PROTECTION* (2003 Dollars)		
Implementation Year	Planned Action	Estimated Cost to Implement Over 10 Years
2005	Develop, implement, sign, monitor, enforce and revise permit program for OHV recreation	\$30,000
2004	Implement the biological monitoring plan for plant species	\$10,000,000
2005	Increase staffing to include a monitoring coordinator	\$1,000,000
2005	Utilize the Internet for both national and international outreach	\$13,000
2005	Update fee business plan	\$15,000
2005	Volunteer Support Staffing / Emergency Medical Staffing / Supervisory Engineer Position	\$525,000*
2005	Law Enforcement Staffing - permanent	\$937,500*
2005	Additional holiday	\$4,387,500*
2006	Designate an interpretive area adjacent to Greys Well Road	\$117,000
2005	Boundary signing	\$20,000
2005	Outreach	\$260,000
<p>* These project modification costs represent a portion of total costs for these planned actions. BLM has identified this portion of total costs as affiliated with PMV protective measures, including enforcing the 2001 closures.</p> <p>Source: ISDRA Business Plan, pgs. 30-32 and BLM; Hamada, March 1, 2004.</p>		

4.2.4 OHV Consumer Surplus Contribution

173. Whether OHV access will be limited in the future within a given management area will depend on the outcome of future section 7 consultations and other management decisions. While future closures of management units are not anticipated to occur by either the Service or BLM, closure of management areas within the ISDRA to OHV use to protect the PMV has occurred in the past. Thus, this section presents the consumer surplus contributions of OHV use within each management area, and, specifically, within the proposed critical habitat designation portion of each management area. To do this, the analysis estimates visitation for

the proposed CHD portion of each management area to be a percentage of total visitation in that management area. This information is intended to help the Service understand potential economic impacts under a variety of management scenarios. Specifically, this section presents the economic contribution that each management area is forecast to provide in terms of OHV recreation in the absence of closures. These contribution estimates represent upper bound estimates of the economic impact that could occur if closure of those areas were to take place.

174. This analysis assumes that the RAMP will be implemented at the end of 2004, and it quantifies the consumer surplus contribution that OHV use provides in seven of the eight management areas. Exhibit 4-10 summarizes the current uses and primary activities within the eight management areas. This analysis focuses on quantifying the consumer surplus contribution of OHV use of the ISDRA.

Exhibit 4-10		
ISDRA MANAGEMENT AREA ACTIVITIES		
Management Area	Current Uses	Primary Activities
Adaptive Management Area	OHV, rights of way	OHV Use
Buttercup Valley	Camping, OHVs, site seeing, vending, education, filming, rights of way, border control activities	OHV Use
Dune Buggy Flats	Camping, OHVs, commercial vending, rights of way	OHV Use
Gecko	OHVs, numerous campgrounds, ranger station, kiosks, volunteer activities, non-profit cleanups	OHV Use
Glamis	Camping, OHVs, commercial vending, rights of way	OHV Use
Mammoth Wash	Camping, hunting, OHVs, right of way, filming	OHV Use
North Algodones Wilderness	Photography, sightseeing, walking, hiking, backpacking, camping, nature study, horseback riding, hunting	Hiking and Horseback Riding
Ogilby	Camping, OHVs, rights of way	OHV Use

175. Current and projected ISDRA visitation levels were used to estimate the extent of OHV visitation in each management area. In 2003, 355,703 vehicle trips were made to the ISDRA. Under implementation of the 2003 RAMP, BLM analysis anticipates that visitation will grow by at least 3.5 percent per year over the next ten years (based on the statewide

average growth rate) and at a maximum of five percent per year until 2013.⁴¹ This analysis applies the 3.5 and five percent growth rate to ISDRA visitation up until 2013. Based on information provided by and conversations with BLM, projecting changes in visitation beyond 2013 is highly speculative.⁴² Despite the difficulty in projecting visitation changes beyond this time, BLM believes that OHV activity would likely continue to occur in the ISDRA beyond 2013. In the absence of information regarding visitation subsequent to 2013, this analysis holds visitation constant at 2013 levels into the future. Moreover, this analysis estimates visitation for the proposed CHD portion of each management area to be a percentage of total visitation for each management area. These percentages are calculated as the ratio of acreage in the proposed CHD portion of each management area to the total acreage in that management area.

176. In addition, this analysis assumes that the RAMP will be implemented at the end of 2004 and the temporary closures will re-open by 2005. After the closures are lifted, the Adaptive Management Area is anticipated to experience an increased share of visitation. This area, the largest of the management areas, received the bulk of the lawsuit closures in terms of acreage.⁴³ In particular, this analysis assumes that visitation within the Adaptive Management Area will increase by 15 percent of total ISDRA trips in 2005.⁴⁴ To the extent that this visitation rebound occurs over a period of time, the early-year (e.g., 2005, 2006, 2007, etc.) visitation estimates for the Adaptive Management Area may be slightly overstated. These projected visitation data are presented in Exhibit 4-11.

⁴¹ The ISDRA has experienced an average annual growth rate of 7.5 percent since 1985. BLM chooses 5.0 percent as the midpoint between the ISDRA and statewide average, BLM 2003b, pgs. 236-237. BLM projected visitation to the ISDRA out 10 years as required for the period of implementation of the RAMP (10 years) and reported in the EIS. BLM has assessed the availability of current camping sites and developed plans for future campsite construction based on projected visitation data.

⁴² BLM is not able to project beyond the 2013 time period due to current and anticipated changes in OHV regulations and the management of OHV recreation. Currently, there are increased restrictions on where OHV users can ride, noise pollution restrictions, and emission restrictions, to name a few. As time goes on, BLM believes there will be competing demands with regards to OHV use (i.e., greater demand for OHV recreation but greater restrictions), but currently there is no way to determine the impact on future visitation rates. (BLM, March 16, 2004)

⁴³ While the closure could have affected visitation at other management areas, no model or behavioral data exist to quantify the impact by management area. Thus, the analysis assumes that the visitation previously lost due to the closure is re-distributed to the Adaptive Management Area.

⁴⁴ This level of projected visitation is considered to be an upper bound estimate, because the 15 percent decline in overall visitation was due to closure of several areas. The Adaptive Management Area has limited access and thus will likely have fewer visitors. The cap of 525 vehicles per day is expected to limit future visitation only if the Adaptive Management Area draws more visitation than 15 percent of total ISDRA trips. While this may occur during high-use times, no data exist to support analysis of this factor. At the upper bound, this analysis assumes that the Adaptive Management Area will receive approximately 250 vehicles per day on average over the season (a season is approximately 250 days long).

Exhibit 4-11						
PROJECTED ISDRA VISITATION BY MANAGEMENT AREA: 2005 - 2024						
	2005		2006-2013		2014-2024 (assumed constant per year)	
	Growth Rate Scenario		Growth Rate Scenario		Growth Rate Scenario	
	Low	High	Low	High	Low	High
Adaptive Management Area	57,156	58,825	Growing at a rate of 3.5 percent per year	Growing at a rate of 5.0 percent per year	75,263	86,911
Buttercup Valley	58,673	60,386			77,261	89,217
Dune Buggy Flats	49,074	50,506			64,621	74,621
Gecko	58,055	59,750			76,448	88,278
Glamis	147,754	152,068			194,564	224,674
Mammoth Wash	131	135			173	199
North Algodones Wilderness	0	0			0	0
Ogilby	10,196	10,494			13,427	15,504
Notes:						
1. Based on information provided by and conversations with BLM, visitation projections are appropriate given the level of current and anticipated on-site infrastructure and services. BLM does not project visitation subsequent to 2013 (BLM, March 1, 2004).						
2. In each management area, visitation associated with the proposed CHD is determined to be a percentage of the total visitation to the management area. These percentages are calculated as the ratio of acreage in the proposed CHD portion of each management area to the total acreage in that management area. To the extent that visitation is lower in the proposed CHD than the other portions of the ISDRA management areas, these are overestimates.						
3. From 2005 to 2024, visitation within the Adaptive Management Area is assumed to represent 15 percent of total ISDRA visitation.						

177. As discussed previously, this analysis uses the benefits transfer approach to estimate the consumer surplus contribution associated with these OHV trips. That is, it applies the OHV use value estimate used previously (Englin, et. al, 2003) to the estimate of OHV opportunities at the ISDRA. The upper end of the range of values estimated by Englin (\$132 per trip) is used to value OHV use in each ISDRA management area.

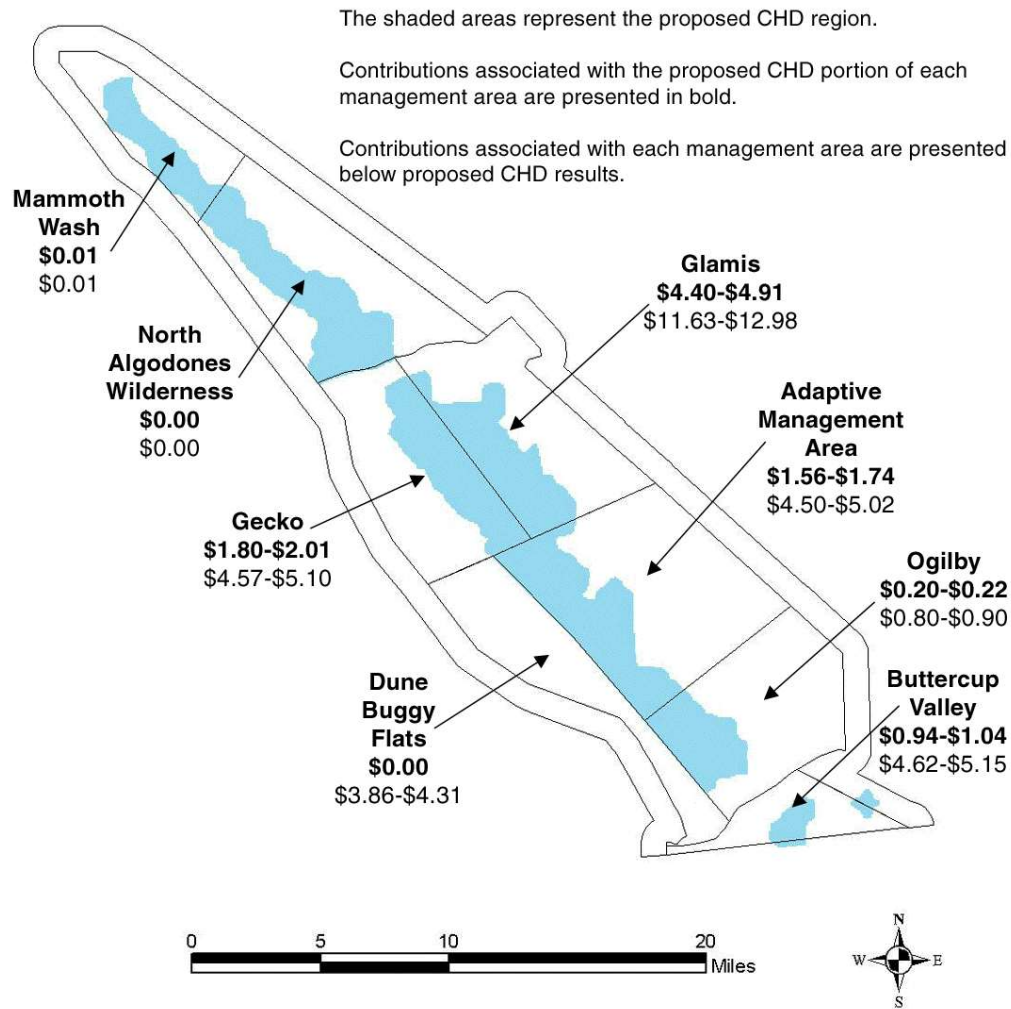
178. The annualized consumer surplus contributions for OHV use in the proposed critical habitat designation and in the ISDRA are presented in Figure 4-1, by management area. Exhibit B-1 in Appendix B presents these contributions in terms of present value. Appendix B also provides estimates of the consumer surplus contributions for each of the ISDRA management areas in total. As noted previously, these results can be used to understand the upper-bound economic efficiency impact of a variety of closure scenarios. For example, if areas proposed for critical habitat designation within the Ogilby management area were closed to OHV use, the upper bound economic efficiency impact would be the sum of the future administrative costs, project modification costs, and the consumer surplus contribution for that region. That is, at the upper bound, a closure of the Ogilby management area would result in an efficiency impact of approximately \$0.77 to \$0.79 million per year (i.e., administrative and project modification costs of approximately \$0.57 million per year, plus the consumer surplus contribution of this portion of the Ogilby management area ranging from approximately \$0.20 million to \$0.22 million annually at a seven percent discount rate). While this and other modeled closures are potentially associated with cost savings to public agencies, local communities, and health and safety service providers, these cost savings are not monetized.
179. If no closures were to take place, the lower bound efficiency effect associated with future PMV protection would be associated with administrative and project modification costs only (i.e., losses to OHV users would be zero). That is, annual impact estimates would be approximately \$0.57 million at a seven percent discount rate.
180. The future impacts of critical habitat designation for the PMV could be lower than the contribution estimates provided in this report. This analysis uses the management unit as the geographic basis for the analysis. To the extent that use actually occurs on only a portion of the unit, it may be possible to close a portion of the management area to OHV use with little change in social welfare.

Impacts Based on Historical Behavior

181. While it is not possible, using existing data, to model the OHV user behavior in response to particular management scenarios for portions of the ISDRA, information on past behavior of OHV recreators in response to closures may provide insights for assessing the impacts of closures on a management area basis. In particular, the American Sand Association believes that the 2000 closure may have impacted visitation by as much as 15 percent in the year subsequent to the closure (ASA, November 19, 2003). This information can be used as an estimate of the behavioral response of OHV users to future closures:
- The 15 percent visitation reduction assumption is associated with a closure of 31 percent of the ISDRA. That is, the ratio of affected acreage to affected visitation is 2:1.

- This ratio can be applied to each management area to determine the number of trips likely to be lost if a management area were to be closed. That is, this ratio implies that a management area closure could result in a 50 percent reduction in visitation (i.e., half of current OHV users would move to other areas of the ISDRA).
- Under these assumptions, the consumer surplus impact of a closure of each of the management areas, in terms of OHV activity, would be 50 percent of the overall OHV contribution in each of the areas (Exhibit 4-13).

Figure 4-1
CONSUMER SURPLUS VALUE GENERATED THROUGH OHV-USE BY
MANAGEMENT AREA
Annualized Over the Time Period 2005 - 2024
(millions of 2003\$)



Notes:

1. In each management area, visitation associated with the proposed CHD portion is determined to be a percentage of the total visitation to that management area. These percentages are calculated as the ratio of acreage in the proposed CHD portion of each management area to the total acreage in that management area. To the extent that visitation is lower in the proposed CHD than the other portions of the ISDRA management areas, these are overestimates.
2. Upper and lower bound estimates reflect two visitation growth rate scenarios based on BLM analysis (BLM, 2003b).
3. Visitation estimates reflect trips taken by OHV use parties (i.e., all individuals in a vehicle) to the management area (BLM, 2003c).
4. The one-mile wide area around the ISDRA exists as a Planning Area Boundary and is not part of the ISDRA.

Exhibit 4-12 POTENTIAL FUTURE CONSUMER SURPLUS IMPACT OF CLOSURES, USING SAND ASSOCIATION- BASED BEHAVIORAL ASSUMPTIONS* Proposed CHD Portion of Management Areas (Millions of 2003 Dollars)	
Management Area	Potential Impact Assuming High Visitation and High Expenditures Per Trip (Annualized over time period 2005 - 2024)
Adaptive Management Area	\$0.87
Buttercup Valley	\$0.52
Dune Buggy Flats	\$0.00
Gecko	\$1.00
Glamis	\$2.45
Mammoth	\$0.00
North Algodones Wilderness	\$0.00
Ogilby	\$0.11
*In each management area, visitation associated with the proposed CHD is determined to be a percentage of the total visitation to the management area. These percentages are calculated as the ratio of acreage in the proposed CHD portion of each management area to the total acreage in that management area. To the extent that visitation is lower in the proposed CHD than the other portions of the ISDRA management areas, these are overestimates.	

182. These behavioral assumptions may not be appropriate to apply to all management areas. For example, the majority of behavioral changes they reflect are associated with the Adaptive Management Area. OHV use in this area is not representative of OHV use in all other management areas. The Adaptive Management Area is a remote area that historically has been less visited than other management areas, and may attract a specific kind of OHV enthusiast. In addition, these estimates may understate the impact of closures for each management area because they do not reflect the consumer surplus loss associated with a reduction in quality of visits for each OHV user who continues to visit the ISDRA. That is, users who continue to take trips may experience congestion at other management areas, or they may incur a consumer surplus loss associated with taking a trip to site that is not their first choice.

4.2.5 Regional Economic Impacts

183. As discussed previously, the outcome of future management actions, including section 7 consultations, are uncertain. As a result, this economic analysis provides estimates of the economic impacts that could occur under a variety of potential future regulatory outcomes. This analysis assumes that the RAMP will be implemented at the end of 2004, and it quantifies the distributional effects of OHV-related expenditures for each of the management areas where OHV use is a primary activity. This section presents the regional economic contributions of OHV use within each management area, and, specifically, within the proposed critical habitat designation portion of each management area. This information is intended to help the Service understand potential economic impacts under a variety of management scenarios. Specifically, this section presents the economic contribution that each management area is forecast to provide in terms of OHV recreation in the absence of closures. These contribution estimates represent upper bound estimates of the economic impact that could occur if closure of those areas were to take place.
184. This analysis relies on the same methodology presented previously to estimate the total economic effects of OHV-related expenditures in each of the management areas. In particular, the regional economic impact of OHV trips taken to the proposed CHD portion of each management area are calculated using estimates of visitation by management area and estimates of expenditures made per OHV trip.
- **OHV Trips by Management Area:** As noted previously, Exhibit 4-12 provides estimates of the number of OHV trips taken in each of the eight management areas, using data provided by BLM. For this analysis, the range of visitation levels for each management area is based on the range of projected growth rates provided by BLM. In particular, BLM anticipates that visitation will grow by at least 3.5 percent per year over ten years (based on the statewide average growth rate) and at a maximum of five percent per year until 2013.⁴⁵ Because information beyond the ten year period is not available, the analysis assumes visitation to remain at the 2013 levels into the future.⁴⁶ In addition, this analysis assumes that the RAMP will be implemented at the end of 2004 and the temporary closures will re-open by 2005. After the closures are lifted, the Adaptive Management Area is anticipated to experience an increased share of visitation. As described in the previous section, this analysis assumes that this area, the largest of the management areas and recipient of the majority of the closures, will see a visitation increase of 15 percent. This analysis estimates projected visitation for the proposed CHD portion of each management area to be a percentage of total visitation for each management area. These percentages are

⁴⁵ The ISDRA has experienced an average annual growth in visitation of 7.5 percent since 1985. BLM chooses 5.0 percent as the midpoint between the ISDRA and statewide average, BLM 2003b, pgs. 236-237.

⁴⁶ Based on information provided by BLM, visitation projections are appropriate given the level of current and anticipated on-site infrastructure and services. BLM does not project visitation subsequent to 2013 (BLM, March 1, 2004).

calculated as the ratio of acreage in the proposed CHD portion of each management area to the total acreage in that management area. That is, the visitation figures in Exhibit 4-12 are multiplied by the percentages of proposed CHD in each management area reported in Exhibit 2-1.

- **Expenditure per Trip:** As discussed previously, estimates for average expenditures per OHV-recreation trip are based on a number of sources: California Department of Parks and Recreation (CA DSPR), American Sand Association (ASA), and other OHV groups representing ISDRA recreation, including the Off Road Business Association recreation. ISDRA-related trip expenditures are estimated by applying the same approach that was used to calculate expenditures for historical trips. Adjusting for the \$15 increase in visitation fees associated with the RAMP implementation, these per-vehicle per-trip estimates range from approximately \$265 to \$515 (Exhibit 4-14).

Exhibit 4-13 OHV-RELATED EXPENDITURES (2003 dollars)		
Expenditure Category	OHV Trip Expenditures	
	Low Estimate	High Estimate
Groceries, Food, and Drinks	\$117.80	\$240.50
OHV Equipment, Supplies and Services	\$95.32	\$194.60
Medical Supplies and Treatment	\$8.67	\$17.70
Visitation Fees (including lodging)	\$25.00	\$25.00
Transportation (including fuel)	\$18.26	\$37.30
Total	\$265	\$515

185. The total expenditures associated with OHV trips taken in year 2013 of the analysis is calculated for each management area by multiplying the average per-trip expenditures by the number of trips associated with each management area (Exhibit 4-15). This expenditures presented in this exhibit show the expenditure contribution for the proposed CHD portion of each management area, as well as the expenditure contribution for the entire management area. The analysis applies the expenditures to 2013 visitation because this year's visitation reflects the upper bound of visitation over the 20-year time frame. BLM visitation projects are estimated up to 2013; beyond this time period, this analysis assumes annual visitation levels remain constant at the 2013 level.

Exhibit 4-14 CONTRIBUTION OF OHV-RELATED EXPENDITURES BY MANAGEMENT AREA Proposed CHD Portion of Management Area and Entire Management Area (Millions of 2003 dollars)*								
Management Area	Imperial County				Yuma County			
	Low Visitation Estimate		High Visitation Estimate		Low Visitation Estimate		High Visitation Estimate	
	Expenditure Scenario							
	Low	High	Low	High	Low	High	Low	High
Adaptive Management Area	\$5.87 \$16.95	\$11.41 \$32.95	\$6.78 \$19.58	\$13.18 \$38.05	\$1.04 \$2.99	\$2.01 \$5.81	\$1.20 \$3.45	\$2.33 \$6.71
Buttercup Valley	\$3.53 \$17.40	\$6.85 \$33.82	\$4.07 \$20.10	\$7.91 \$39.05	\$0.62 \$3.07	\$1.21 \$5.97	\$0.72 \$3.55	\$1.40 \$6.89
Dune Buggy Flats	\$0.00 \$14.56	\$0.00 \$28.29	\$0.00 \$16.81	\$0.00 \$32.67	\$0.00 \$2.57	\$0.00 \$4.99	\$0.00 \$2.97	\$0.00 \$5.76
Gecko	\$6.78 \$17.22	\$13.19 \$33.46	\$7.83 \$19.88	\$15.23 \$38.64	\$1.20 \$3.04	\$2.33 \$5.91	\$1.38 \$3.51	\$2.69 \$6.82
Glamis	\$16.57 \$43.83	\$32.19 \$85.17	\$19.13 \$50.61	\$37.17 \$98.35	\$2.92 \$7.73	\$5.68 \$15.03	\$3.38 \$8.93	\$6.56 \$17.36
Mammoth	\$0.02 \$0.04	\$0.05 \$0.08	\$0.03 \$0.04	\$0.06 \$0.09	\$0.00 \$0.01	\$0.01 \$0.01	\$0.01 \$0.01	\$0.01 \$0.02
North Algodones Wilderness	\$0.00 \$0.00	\$0.00 \$0.00	\$0.00 \$0.00	\$0.00 \$0.00	\$0.00 \$0.00	\$0.00 \$0.00	\$0.00 \$0.00	\$0.00 \$0.00
Ogilby	\$0.75 \$3.02	\$1.45 \$5.88	\$0.86 \$3.49	\$1.67 \$6.79	\$0.13 \$0.53	\$0.26 \$1.04	\$0.15 \$0.62	\$0.30 \$1.20
*Expenditures associated with proposed CHD portion of each management area are presented in bold. Expenditures associated with the entire portion of each management area are presented below the proposed CHD expenditures. Upper and lower bound estimates reflect two visitation growth rate scenarios based on BLM analysis (BLM, 2003b), and two estimates of trip expenditures based on a number of sources: California Department of State Parks and Recreation, American Sand Association, and other OHV groups representing ISDRA recreation, including the Off-Road Business Association.								

186. The regional economic contributions associated with OHV use within the proposed critical habitat designation and in the ISDRA are presented in Figure 4-2 for each management area. These results are broadly consistent with BLM and American Sand Association regional economic impact results discussed previously in Section 3. These results can also be used to understand the upper-bound regional impacts of a variety of closure

scenarios. For example, as shown in Figure 4-2, if areas proposed for critical habitat designation within the Ogilby management area were closed to OHV use, the regional economy would see an upper bound reduction in output of \$1.23 million to \$2.75 million in year 2013 (2003 dollars) and in jobs of 27 to 58.⁴⁷ The upper bound output estimate for Ogilby (\$2.75 million) represents approximately 0.03 percent of total output within Imperial and Yuma Counties (\$8.58 billion). Total jobs associated with the reduction in output associated with Ogilby (58) represent 0.04 percent of employment in both counties (133,807) (IMPLAN 1998 data files for Imperial and Yuma Counties, IEc IMPLAN analysis). If no closures were to take place, the lower bound regional economic impact would be zero. The majority of the regional economic contributions are associated with Imperial County, as the majority of OHV-related expenditures are incurred within Imperial. Appendix B presents the detailed results of the regional economic contribution analysis. While this and other modeled closures are potentially associated with cost savings to public agencies, local communities, and health and safety service providers, these cost savings are not monetized.

187. It is important to note that measures of regional economic impact are entirely distinct from the reported efficiency effects. As such these two measures of impact cannot be directly compared and should not be summed.

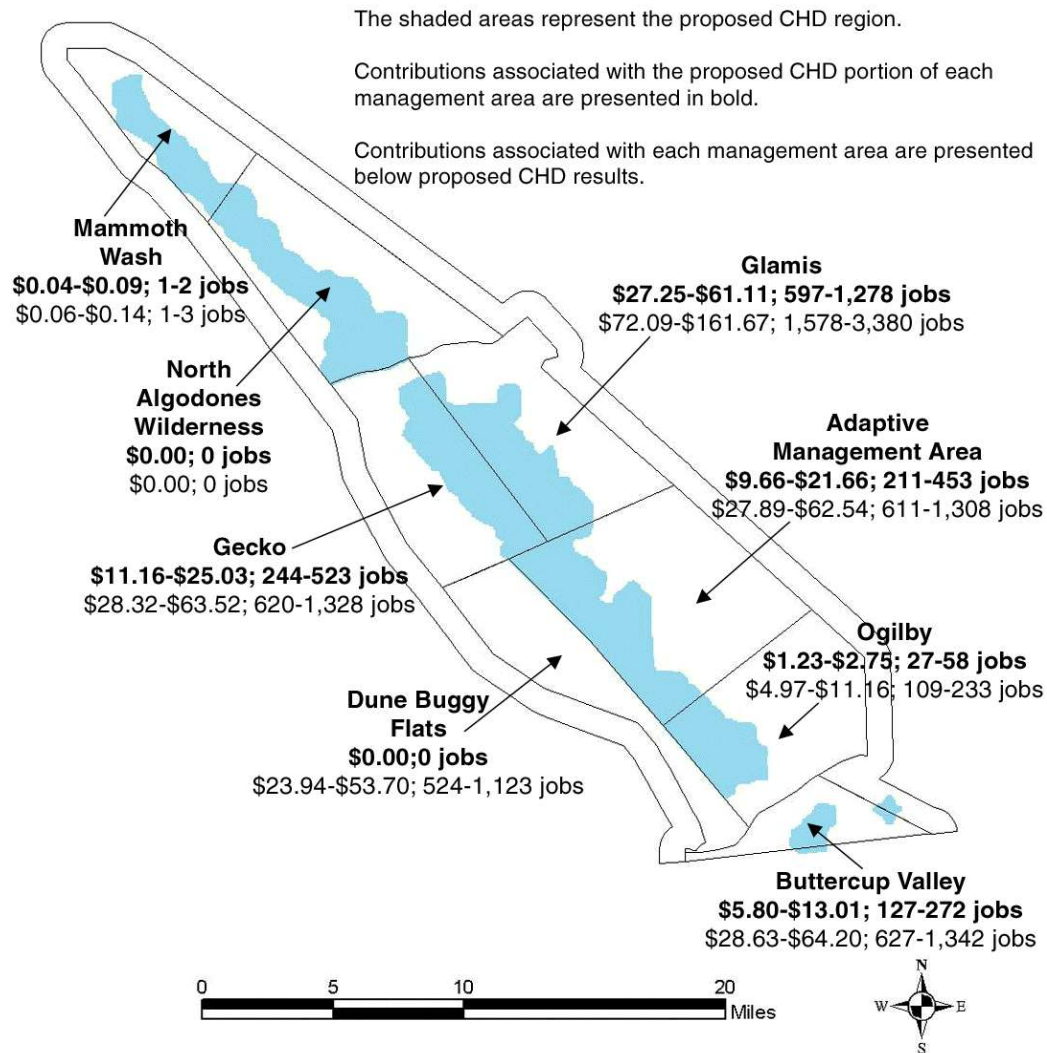
Impacts Based on Historical Behavior

188. As discussed in the previous section on efficiency effects, while it is not possible, using existing data, to model the OHV user behavior in response to particular management scenarios for portions of the ISDRA, information on past behavior of OHV recreators in response to closures may provide insights for assessing the impacts of closures on a management area basis. Using the same assumptions as that previous analysis, Exhibit 4-15 presents the regional economic impacts of a closure of each of the management areas. It is important to acknowledge the uncertainty associated with these estimates. As described in detail in the previous section, it may be inappropriate to apply these behavioral assumptions to all management areas.

⁴⁷ The reported range reflects uncertainty in average expenditures per user-day. Regional economic impacts for 2013 are reported in this example since visitation is expected to rise until that year, and then level off. Thus, the impacts associated with closures in other years would be smaller.

Exhibit 4-15 POTENTIAL FUTURE REGIONAL ECONOMIC IMPACT OF CLOSURES, USING SAND ASSOCIATION- BASED BEHAVIORAL ASSUMPTIONS* Proposed CHD Portion of each Management Area Year 2013 (Millions of 2003 Dollars)	
Management Area	Potential Impact Assuming High Visitation and High Expenditures Per Trip (Annualized over time period 2005 - 2024)
Adaptive Management Area	\$10.83
Buttercup Valley	\$6.50
Dune Buggy Flats	\$0.00
Gecko	\$12.51
Glamis	\$30.55
Mammoth	\$0.05
North Algodones Wilderness	\$0.00
Ogilby	\$1.38
*In each management area, visitation associated with the proposed CHD is determined to be a percentage of the total visitation to the management area. These percentages are calculated as the ratio of acreage in the proposed CHD portion of each management area to the total acreage in that management area. To the extent that visitation is lower in the proposed CHD than the other portions of the ISDRA management areas, these are overestimates.	

Figure 4-2
REGIONAL ECONOMIC CONTRIBUTION FROM OHV-USE BY
MANAGEMENT AREA, YEAR 2013*
(millions of 2003\$)



Notes:

1. In each management area, visitation associated with the proposed CHD portion is determined to be a percentage of the total visitation to that management area. These percentages are calculated as the ratio of acreage in the proposed CHD portion of each management area to the total acreage in that management area. To the extent that visitation is lower in the proposed CHD than the other portions of the ISDRA management areas, these are overestimates.
2. Upper and lower bound estimates reflect two visitation growth rate scenarios based on BLM analysis (BLM, 2003b), and two estimates of trip expenditures based on a number of sources: California Department of State Parks and Recreation, American Sand Association, and other OHV groups representing ISDRA recreation, including the Off-Road Business Association.
3. Visitation estimates reflect trips taken by OHV use parties (i.e., all individuals in a vehicle) to the management area (BLM, 2003c).
4. The one-mile wide area around the ISDRA exists as a Planning Area Boundary and is not part of the ISDRA.

4.2.6 Summary of Potential Future Impacts

189. Whether OHV access will be limited in the future within a given management area will depend on the outcome of future section 7 consultations and other management decisions. While future closures of management units are not anticipated to occur by either the Service or BLM, closure of management areas within the ISDRA to OHV use to protect the PMV has occurred in the past. Thus, this analysis presents the economic efficiency and regional economic contributions of OHV use within each management area, and, specifically, within the proposed critical habitat designation portion of each management area. This information is intended to help the Service understand potential economic impacts under a variety of management scenarios. With the exception of the expected RAMP-related administrative and project modification costs, the lower bound impact is zero (i.e., no restrictions on access to OHV use). This analysis uses the management unit as the geographic basis for the analysis. To the extent that use actually occurs on only a portion of the unit, it may be possible to close a portion of the management area to OHV use with little change in social welfare or regional economic contribution.
190. The annualized consumer surplus contributions for OHV use in the proposed critical habitat designation and in the ISDRA as a whole are presented in Figure 4-1. As noted previously, these results can be used to understand the range of economic efficiency impacts under a variety of management scenarios:
- If areas proposed for critical habitat designation within a certain management area were closed to OHV use, the upper bound economic efficiency impact would be the sum of the future administrative costs, project modification costs, and the consumer surplus contribution for that region. For example, if all of the areas proposed for designation within the ISDRA were closed to OHV use, the efficiency effects would range from \$9.5 million per year to \$10.5 million per year (\$0.57 million per year in administrative and project modification costs plus consumer surplus impacts ranging from \$8.9 million per year to \$9.9 million per year) (2003 dollars).
 - If no closures were to take place, the efficiency effect associated with future PMV protection would be associated with administrative and project modification costs only (i.e., losses to OHV users would be zero). That is, annual impact estimates would be approximately \$0.57 million (Exhibit 4-16).

Exhibit 4-16 SUMMARY OF POTENTIAL FUTURE EFFICIENCY EFFECTS 2005-2024 (Millions of Dollars, 7% Discount Rate)			
Consumer Surplus (Reduced OHV opportunities, proposed CHD)	Administrative Costs	Project Modification Costs	TOTAL
Depends on management scenario. See Figure 4-1.	\$0.02	\$11.36	\$11.38
Annualized:			\$0.57
*Efficiency effects estimates are calculated using a three percent discount rate in Appendix C.			

191. The regional economic contributions associated with OHV use within the proposed critical habitat designation portions of each management area and for each management area as a whole are presented in Figure 4-2. As noted previously, these results can be used to understand the range of distributional impacts under a variety of management scenarios:
- If areas proposed for critical habitat designation within a certain management area were closed to OHV use, the upper bound regional economic impact would be the reduction in output, jobs, and taxes for that region. For example, if all of the areas proposed for designation within the ISDRA were closed to OHV use, the regional economy would see an upper bound reduction in output of \$55 million to \$124 million in year 2013 (2003 dollars), and a potential loss in employment of 1,207 to 2,585 jobs.
 - If no closures were to take place, the regional economic impact associated with future PMV protection would be zero.
192. The economic baseline for Imperial and Yuma Counties provides a basis of comparison for the result of the regional economic contributions. Output (i.e., industry revenue) for all industries in these two counties is approximately \$8.6 billion. Employment in these two counties is approximately 134,000. Estimates of the contribution of areas proposed for designation to output and to employment for each management area are presented in Exhibit ES-5.

Exhibit 4-17						
REGIONAL ECONOMIC OUTPUT AND EMPLOYMENT OF PROPOSED CHD AS PERCENT OF ECONOMIC STUDY AREA TOTALS Upper Bound Estimate*						
Management Area	OUTPUT			EMPLOYMENT		
	Imperial and Yuma County Output (millions)	Proposed CHD Output (millions)	Contribution of Areas Proposed for Designation to Output	Imperial and Yuma County Employment	Contribution of Areas Proposed for Designation to Output	Percent of Total Imperial and Yuma County Employment
Adaptive Management Area	\$8,575.89	\$21.66	0.25%	133,908	453	0.34%
Buttercup		\$13.01	0.15%		272	0.20%
Dune Buggy Flats		\$0.00	0.00%		0	0.00%
Gecko		\$25.03	0.29%		523	0.39%
Glamis		\$61.11	0.71%		1,278	0.95%
Mammoth Wash		\$0.09	0.00%		2	0.00%
North Algodones Wilderness		\$0.00	0.00%		0	0.00%
Ogilby		\$2.75	0.03%		58	0.04%
Proposed CHD Total		\$123.65	1.44%		2,585	1.93%
Notes: * Upper bound estimates include high visitation estimates (5.0 percent per year, based on BLM analysis) and high expenditures per trip (\$515, based on information provided by the American Sand Association, BLM, and CA DPR). Source: IMPLAN 1998, and IEc analysis.						

193. It is not possible, using existing data, to model the OHV user behavior in response to particular management scenarios for portions of the ISDRA. Using information on past behavior of OHV recreators in response to closures may provide insights for assessing the impacts of closures on a management area basis. Analysis of these data indicates that overall impacts could be less than the contributions reported for each management area. A number

of uncertainties are associated with this approach. First, past behavior associated with closures that mainly involved the Adaptive Management Area are not indicators of future behavior in other management areas. Second, these assumptions result in estimates that may understate the impacts of a closure because they do not incorporate losses associated with quality changes for individuals who continue to recreate at the ISDRA.

194. It is important to recognize the uncertainty inherent in the assumptions underlying this analysis of potential future impacts. In addition to those described in Section 4.1.6, the Exhibit 4-18 discusses the additional uncertainties associated with the analysis of potential future impacts.

<p align="center">Exhibit 4-18</p> <p align="center">CAVEATS TO THE ECONOMIC ANALYSIS</p>	
Key Assumption	Effect on Impact Estimate
This economic analysis does not provide estimates of economic impacts that could occur to activities other than OHV use. Although not likely to be a significant threat to the PMV, limitations on other activities (e.g., hiking, horseback riding) could lead to additional consumer surplus and regional economic impacts.	-
This economic analysis relies on BLM estimates of projected visitation to the ISDRA up to year 2013. In the absence of visitation projections beyond that date, holds visitation constant at 2013 levels into the future. If the demand for OHV visits were to continue to rise beyond 2013, this assumption would understate the present value impact of closures.	-
It is not possible to forecast with certainty whether critical habitat designation would result in closures of portions of the ISDRA. To the extent that closures do not occur, forecast impacts associated with lost OHV trips will not occur.	+
It is not possible, using existing data, to predict the percentage of OHV users who visit areas of the ISDRA that are proposed for critical habitat. Lacking detailed user data, this analysis assumes that visitation within the ISDRA is evenly distributed within each management area. To the extent that areas proposed for designation are less popular with OHV users, this analysis could overstate impacts by overestimating the number of trips that could be affected by the designation. In fact, the Service has avoided designating many of the concentrated use areas in the ISDRA, in particular intensive OHV activity areas.	+
It is not possible, using existing data, to model OHV recreationist behavior in response to the closure of one or more management areas within the ISDRA. To the extent that acceptable substitute sites are available to these users, this analysis may overstate the consumer surplus impact of any closures.	+
This analysis assumes that visitation within the Adaptive Management Area will increase by 15 percent of total ISDRA trips in 2005. To the extent that this visitation rebound occurs over a period of time, the early-year (e.g., 2005, 2006, 2007, etc.) visitation estimates for the Adaptive Management Area may be slightly overstated.	+
<p>- : This assumption may result in an underestimate of real costs.</p> <p>+ : This assumption may result in an overestimate of real costs.</p> <p>+/- : This assumption has an unknown effect on estimates.</p>	

195. Measures of economic efficiency are entirely distinct from regional economic impact measures. As such, these two measures of impact cannot be directly compared and should not be summed.

4.3 Small Business Impact Analysis

196. This section considers the extent to which the analytic results presented above reflect impacts to small businesses. The analysis presented in this section is based on information gathered from the U.S. Census Bureau and Dun and Bradstreet, and comparisons with the results of the analysis.⁴⁸
197. This analysis assumes that the majority of the OHV-related expenditures made to the local economy in Imperial County (California) and Yuma County (Arizona) are made at small businesses. In fact, several businesses that operate within Imperial and Yuma Counties are dependent on recreational activities that occur within the ISDRA. Moreover, major towns in the counties have a number of small businesses that specifically sell OHVs and OHV accessories and services, and market to both local and tourist populations. (Imperial County Board of Supervisors, November 24, 2003; Brawley Chamber of Commerce, December 2, 2003; ORBA, November 21, 2003) In addition, a number of small businesses exist within the geographical boundaries of the ISDRA itself, catering exclusively to dune visitors.
- As Exhibits 4-3 and 4-14 show, the bulk of the OHV-related expenditures are made in two major categories: (1) Groceries, Food and Drinks; and (2) OHV Equipment, Supplies and Services. Because expenditures in these categories reflect between 80 and 85 percent of all OHV-related expenditures, this analysis focuses on expenditures in these two categories.
 - Exhibit 4-19 reports the total number of businesses in Imperial and Yuma Counties that are associated with these expenditures, by NAICS (North American Industry Classification System) code. This exhibit also indicates the number of these businesses that are classified as small businesses. In particular, in Imperial and Yuma counties, 117 small businesses are related to Motor Vehicle and Parts Dealers; 266 are related to retail Food and Beverage Stores; and 309 are related to Food Services and Drinking Places.

⁴⁸ This information was gathered in a Dialog search of File 516, Dun and Bradstreet, "Dun's Market Identifiers."

Exhibit 4-19					
TOTAL NUMBER OF RETAIL SMALL BUSINESSES ASSOCIATED WITH MAJOR OHV-RELATED EXPENDITURES					
NAICS Code	Expenditure Category	Imperial County, CA		Yuma County, AZ	
		All Businesses	Small Businesses	All Businesses	Small Businesses
Motor Vehicle and Parts Dealers:					
44121	Recreational Vehicle Dealers	4	4	19	18
44131	Automotive Parts and Accessories Stores	31	31	32	32
44132	Tire Dealers	17	16	16	16
Food and Beverage Stores:					
44511	Supermarkets and Other Grocery (except Convenience) Stores	88	79	41	40
44512	Convenience Stores	29	28	29	29
44521	Meat Markets	9	8	4	3
44522	Fish and Seafood Markets	0	0	1	1
44523	Fruit and Vegetable Markets	7	6	11	11
44529	Other Specialty Food Stores	22	18	19	16
44531	Beer, Wine, and Liquor Stores	13	13	14	14
Food Services and Drinking Places:					
72211	Full-Service Restaurants	134	70	147	98
72221	Limited-Service Eating Places	58	45	68	54
72233	Mobile Food Services	1	1	3	2
72241	Drinking Places (Alcoholic Beverages)	7	7	32	32
Source: Dialog search of File 516, Dun and Bradstreet, “Dun’s Market Identifiers.”					

- The small business size standards for these businesses are presented in Exhibit 4-20. This analysis assumes that the total sales of all small businesses in the two counties is equivalent to the small business size standard. Under this assumption, the total of small business sales in Imperial County to businesses in sectors that serve OHV recreators is approximately \$3,488 million, where \$244 million is associated with motor vehicle and parts dealers, \$2,731 million is associated with food and beverage

stores, and \$513 million is associated with food services and drinking places. In Yuma County, total sales by small businesses in sectors that serve OHV recreators is approximately \$3,369 million, where \$396 million is associated with Motor Vehicle and Parts Dealers, \$1,857 million is associated with Food and Beverage Stores, and \$1,116 million is associated with Food Services and Drinking Places.

Exhibit 4-20				
SMALL BUSINESS SIZE STANDARDS AND ESTIMATED SALES FOR BUSINESSES ASSOCIATED WITH MAJOR OHV-RELATED EXPENDITURES (millions of 2003 Dollars)				
NAICS Code	Expenditure Category	Size Standard	Imperial County, CA	Yuma County, AZ
			Estimated Small Business Sales	Estimated Small Business Sales
Motor Vehicle and Parts Dealers:				
44121	Recreational Vehicle Dealers	\$6.0	\$24.0	\$108.0
44131	Automotive Parts and Accessories Stores	\$6.0	\$124.0	\$192.0
44132	Tire Dealers	\$6.0	\$96.0	\$96.0
Food and Beverage Stores:				
44511	Supermarkets and Other Grocery (except Convenience) Stores	\$23.0	\$1,817.0	\$920.0
44512	Convenience Stores	\$23.0	\$644.0	\$667.0
44521	Meat Markets	\$6.0	\$48.0	\$18.0
44522	Fish and Seafood Markets	\$6.0	\$0.0	\$6.0
44523	Fruit and Vegetable Markets	\$6.0	\$36.0	\$66.0
44529	Other Specialty Food Stores	\$6.0	\$108.0	\$96.0
44531	Beer, Wine, and Liquor Stores	\$6.0	\$78.0	\$84.0
Food Services and Drinking Places:				
72211	Full-Service Restaurants	\$6.0	\$420.0	\$588.0
72221	Limited-Service Eating Places	\$6.0	\$45.0	\$324.0
72233	Mobile Food Services	\$6.0	\$6.0	\$12.0
72241	Drinking Places (Alcoholic Beverages)	\$6.0	\$42.0	\$192.0
TOTAL:			\$3,488.0	\$3,369.0
Source: Dialog search of File 516, Dun and Bradstreet, “Dun’s Market Identifiers.”				

- Exhibit 4-21 presents the percentage of small business sales associated with major OHV-related expenditures assigned to the proposed CHD portion of each management area, by county. Development of this estimate required an estimate of the expenditures associated with Groceries, Food and Drinks and Equipment, Supplies and Services by management area, for each county. The analysis uses the following information to estimate expenditures in these sectors by county:
 - ▶ Projected ISDRA visitation levels in 2013 under the high growth rate scenario (Exhibit 4-11);
 - ▶ Projected visitation in the proposed CHD portion of each management area is a proportion of projected visitation for the entire management area based on the ratio of acreage in the two regions (Exhibit 2-1);
 - ▶ OHV trip expenditures on Groceries, Food and Drinks, and OHV Equipment Supplies and Services under the high expenditure scenario (Exhibit 4-3).
 - ▶ Approximately 85 percent of OHV expenditures are made in Imperial County and 15 percent of OHV expenditures are made in Yuma County.

These expenditure estimates, shown in the second column of Exhibit 4-21, are compared to the total of small business sales in each county, as reported in Exhibit 4-20. The results of this analysis show that proposed CHD management area impacts could range from zero to 0.9 percent of small business sales, depending on the management area. It is important to recognize that the estimates of total small business sales likely overstate output by small businesses by assuming all small businesses are at the size standard thresholds provided in Exhibit 4-20.

Exhibit 4-21 PERCENTAGE OF SMALL BUSINESS SALES GENERATED BY UPPER BOUND OHV-RELATED EXPENDITURES ASSOCIATED WITH THE PROPOSED CHD (Millions of 2003 Dollars)						
Management Area	IMPERIAL COUNTY			YUMA COUNTY		
	Major OHV- Related Expenditures	Small Business Sales*	Percent	Major OHV- Related Expenditures	Small Business Sales*	Percent
Adaptive Management Area	\$11.31	\$3,488	0.32%	\$1.96	\$3,369	0.06%
Buttercup Valley	\$6.69		0.19%	\$1.18		0.04%
Dune Buggy Flats	\$0.00		0.00%	\$0.00		0.00%
Gecko	\$12.86		0.37%	\$2.27		0.07%
Glamis	\$31.41		0.90%	\$5.54		0.16%
Mammoth	\$0.05		0.00%	\$0.01		0.00%
North Algodones Wilderness	\$0.00		0.00%	\$0.00		0.00%
Ogilby	\$1.41		0.04%	\$0.25		0.01%
*The estimates of small business sales likely overstate output by small businesses by assuming all small businesses are at the size standard thresholds provided in Exhibit 4-20.						

198. At the county level, these impacts are not significant. However, it is likely that the expenditure impacts presented in this report would take place in communities near the ISDRA. To the extent that these expenditures are concentrated in specific geographic locations, changes in OHV activity levels could have a significant impact on affected small businesses.

4.4 Potential Impacts to the Energy Industry

199. Pursuant to Executive Order No. 13211, "Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use," issued May 18, 2001, Federal agencies must prepare and submit a "Statement of Energy Effects" for all "significant energy actions." The purpose of this requirement is to ensure that all Federal agencies "appropriately

weigh and consider the effects of the Federal Government's regulations on the supply, distribution, and use of energy."⁴⁹ The Office of Management and Budget has provided guidance for implementing this Executive Order that outlines nine outcomes that may constitute "a significant adverse effect" when compared without the regulatory action under consideration:

- Reductions in crude oil supply in excess of 10,000 barrels per day (bbls);
- Reductions in fuel production in excess of 4,000 barrels per day;
- Reductions in coal production in excess of 5 million tons per year;
- Reductions in natural gas production in excess of 25 million Mcf per year;
- Reductions in electricity production in excess of 1 billion kilowatts-hours per year or in excess of 500 megawatts of installed capacity;
- Increases in energy use required by the regulatory action that exceed the thresholds above;
- Increases in the cost of energy production in excess of one percent;
- Increases in the cost of energy distribution in excess of one percent; or
- Other similarly adverse outcomes.⁵⁰

200. None of these criteria are relevant to this analysis. As noted by BLM, the likelihood of any energy-related activity occurring within the proposed CHD is minimal for a number of reasons. First, utility corridors exist outside of the proposed CHD area (BLM, December 2, 2003). Second, areas likely to experience development have been excluded from the proposed designation. Third, these activities likely would be discouraged by BLM in the proposed critical habitat areas for potentially interfering with the recreational function of the ISDRA. Fourth, the construction and maintenance of projects (such as utility lines) away from current roads, canals, and railways and through the central, more remote portions of the dunes is likely to be economically infeasible (BLM, December 2, 2003).

⁴⁹ Memorandum For Heads of Executive Department Agencies, and Independent Regulatory Agencies, Guidance For Implementing E.O. 13211, M-01-27, Office of Management and Budget, July 13, 2001, <http://www.whitehouse.gov/omb/memoranda/m01-27.html>.

⁵⁰ Ibid.

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Appendix A

REGULATORY BACKGROUND

Exhibit A-1

REGULATORY BACKGROUND FOR PEIRSON'S MILK-VETCH

Date	Management Action
1976	<ul style="list-style-type: none">Federal Land Policy Management Act passed by Congress directs BLM to develop land use plans for public lands based on the principle of "multiple use and sustained yield." Section 601 of the Act creates the California Desert Conservation Area (CDCA), a 25 million acre expanse of land in Southern California. Congress directs BLM, responsible for administering 10 million acres of the CDCA, to prepare and implement a comprehensive long-range plan for the management, use, development, and protection of public lands within the CDCA.
1977	<ul style="list-style-type: none">BLM contracts WESTEC Services, Inc. to survey sensitive plants including the PMV within the Algodones Dunes.
1979	<ul style="list-style-type: none">PMV designated as state endangered species by the State of California.
1980	<ul style="list-style-type: none">BLM develops CDCA Plan based on concepts of multiple use, sustained yield, and maintenance of environmental quality. The CDCA Plan establishes four multiple-use classes for activities such as motorized-vehicle access, recreation, and vegetation. The North Algodones region within the ISDRA is classified under the CDCA as a controlled area, to be preserved in natural state with access generally limited to non-motorized, non-mechanized means.
1987	<ul style="list-style-type: none">BLM Recreation Area Management Plan (RAMP) implemented for management of ISDRA. RAMP includes monitoring system for 15 animal and plant species, including the PMV. Based on monitoring results, BLM reserves the right to reduce resource use within ISDRA. No reduction in resource use is requested.
1994	<ul style="list-style-type: none">The California Desert Protection Act designates the 26,202 acre North Algodones dunes as a Wilderness Area to be managed by BLM as part of the National Wilderness Preservation System. This wilderness area is closed to motorized vehicle use, but accessible by hiking and horseback riding. This closure has a minimal effect on OHV recreational visitation, because the North Algodones area was classified under the 1980 CDCA Plan as a controlled area, with access generally limited to non-motorized means.Wilderness Area is enforced by sign installation and patrolling by BLM.

<p align="center">Exhibit A-1</p> <p align="center">REGULATORY BACKGROUND FOR PEIRSON'S MILK-VETCH (continued)</p>	
Date	Management Action
1998	<ul style="list-style-type: none"> PMV is listed as threatened plant by US Department of Interior on October 6th, due to threats of increasing habitat loss from OHV use and associated recreational development, destruction of plants, and lack of protection afforded to the plant under State law. BLM expands monitoring efforts for PMV subsequent to the listing.
2000	<ul style="list-style-type: none"> In March, a lawsuit is filed against BLM by the Center for Biological Diversity and other groups alleging that BLM was in violation of section 7 of the ESA by failing to enter into formal consultation with the Service on the effects of the adoption of the 1980 CDCA Plan on threatened and endangered species. In August, BLM acknowledges that activities authorized, permitted, or allowed under CDCA Plan may adversely affect threatened and endangered species and agrees to initiate section 7 consultation with the Service on the CDCA Plan and the management of the ISDRA In November, BLM implements interim actions to provide protection to threatened and endangered species pending completion of Section 7 consultation with Service. 49,310 acres of the ISDRA are temporary closed to provide protection to PMV within the Adaptive Management Area, Mammoth Wash, Gecko, Glamis, Dune Buggy Flats, and Buttercup management areas.
2002	<ul style="list-style-type: none"> In 2002, BLM releases an Environmental Impact Statement and proposed RAMP for managing the ISDRA, which proposes to retain 1994 Northern Algodones Dunes as closed to motorized vehicular use, retain 2000 closure of Buttercup Valley to OHV use and camping, but reopen Adaptive Management Area and Gecko Area with cap of 525 vehicles per day. RAMP proposes extensive monitoring plan for PMV.
2003	<ul style="list-style-type: none"> Service issues Biological Opinion (BO) on CDCA Plan and management of ISDRA. BO specifies that BLM should increase precision of monitoring plan, fund/implement studies to answer questions regarding effects of OHV on PMV, and reinitiate consultation based on reduction in PMV baseline conditions in or within four years. BO includes no specifications for opening, closing, or limiting acreage to OHV use.

Appendix B

DETAILED RESULTS FROM ANALYSIS OF POTENTIAL FUTURE IMPACTS

Exhibits B-1 through B-5 present the detailed results of the future consumer surplus and regional economic contribution of OHV activity within the ISDRA (described in detail in Sections 4.2.4, 4.2.5, and 4.2.6). Exhibits B-1 and B-3 present contributions of the proposed critical habitat areas, while Exhibits B-2 and B-4 present total contributions for all ISDRA management areas. To estimate these contributions, this analysis estimates visitation for the proposed CHD portion of each management area to be a percentage of total visitation for each management area. These percentages are calculated as the ratio of acreage in the proposed CHD portion of each management area to the total acreage in that management area. Lower and upper bound estimates reflect two visitation growth rate scenarios (i.e., annual growth rates of 3.5 percent and 5.0 percent) beginning in 2005 and continuing until the year 2013 based on BLM analysis (BLM, 2003b). Information beyond the ten year period is not available, and this analysis assumes visitation to remain at the 2013 levels into the future.

Exhibit B-1 UPPER AND LOWER BOUND CONSUMER SURPLUS CONTRIBUTIONS FROM OHV-USE* Proposed CHD Management Areas 2004 - 2024 (Millions of 2003 dollars, 7 percent discount rate)		
Management Area	Lower Bound Present Value (Annualized Value)	Upper Bound Present Value (Annualized Value)
Adaptive Management Area	\$31.16 (\$1.56)	\$34.77 (\$1.74)
Buttercup Valley	\$18.72 (\$0.94)	\$20.88 (\$1.04)
Dune Buggy Flats	\$0.00 (\$0.00)	\$0.00 (\$0.00)
Gecko	\$36.01 (\$1.80)	\$40.18 (\$2.01)
Glamis	\$87.92 (\$4.40)	\$98.10 (\$4.91)
Mammoth	\$0.13 (\$0.01)	\$0.15 (\$0.01)
North Algodones Wilderness	\$0.00 (\$0.00)	\$0.00 (\$0.00)
Ogilby	\$3.96 (\$0.20)	\$4.42 (\$0.22)
<p>* In each management area, visitation associated with the proposed CHD is determined to be a percentage of the total visitation to the management area. These percentages are calculated as the ratio of acreage in the proposed CHD portion of each management area to the total acreage in that management area. To the extent that visitation is lower in the proposed CHD than the other portions of the ISDRA management areas, these are overestimates.</p>		

Exhibit B-2 UPPER AND LOWER BOUND CONSUMER SURPLUS CONTRIBUTIONS FROM OHV-USE* ISDRA Management Areas 2004 - 2024 (Millions of 2003 dollars, 7 percent discount rate)		
Management Area	Lower Bound Present Value (Annualized Value)	Upper Bound Present Value (Annualized Value)
Adaptive Management Area	\$89.98 (\$4.50)	\$100.40 (\$5.02)
Buttercup Valley	\$92.37 (\$4.62)	\$103.06 (\$5.15)
Dune Buggy Flats	\$77.26 (\$3.86)	\$86.20 (\$4.31)
Gecko	\$91.40 (\$4.57)	\$101.98 (\$5.10)
Glamis	\$232.62 (\$11.63)	\$259.55 (\$12.98)
Mammoth	\$0.21 (\$0.01)	\$0.23 (\$0.01)
North Algodones Wilderness	\$0.00 (\$0.00)	\$0.00 (\$0.00)
Ogilby	\$16.05 (\$0.80)	\$17.91 (\$0.90)
*Upper and lower bound estimates reflect two visitation growth rate scenarios based on BLM analysis (BLM, 2003b).		

Exhibit B-3

**REGIONAL ECONOMIC CONTRIBUTION FROM OHV-USE, YEAR 2013
Proposed CHD Management Areas of ISDRA Imperial and Yuma Counties
(2003 dollars)**

Management Area	IMPLAN Results	Total Impact Assuming Low Visitation		Total Impact Assuming High Visitation	
		Low Estimate (\$265 per trip)	High Estimate (\$515 per trip)	Low Estimate (\$265 per trip)	High Estimate (\$515 per trip)
Adaptive Management Area	Output	\$9,657,717	\$18,756,326	\$11,152,315	\$21,658,995
	Employment	211	392	244	453
	Taxes	\$630,944	\$1,236,314	\$728,587	\$1,427,642
Buttercup Valley	Output	\$5,800,359	\$11,264,921	\$6,698,004	\$13,008,245
	Employment	127	236	147	272
	Taxes	\$378,941	\$742,522	\$437,585	\$857,432
Dune Buggy Flats	Output	\$0	\$0	\$0	\$0
	Employment	0	0	0	0
	Taxes	\$0	\$0	\$0	\$0
Gecko	Output	\$11,160,365	\$21,674,630	\$12,887,508	\$25,028,926
	Employment	244	453	282	523
	Taxes	\$729,113	\$1,428,673	\$841,949	\$1,649,769
Glamis	Output	\$27,247,799	\$52,918,157	\$31,464,582	\$61,107,602
	Employment	597	1,107	689	1,278
	Taxes	\$1,780,115	\$3,488,074	\$2,055,600	\$4,027,877
Mammoth	Output	\$41,106	\$79,832	\$47,467	\$92,186
	Employment	1	2	1	2
	Taxes	\$2,685	\$5,262	\$3,101	\$6,076
North Algodones Wilderness	Output	\$0	\$0	\$0	\$0
	Employment	0	0	0	0
	Taxes	\$0	\$0	\$0	\$0
Ogilby	Output	\$1,227,051	\$2,383,065	\$1,416,946	\$2,751,861
	Employment	27	50	31	58
	Taxes	\$80,164	\$157,079	\$92,570	\$181,388

Notes:

1. Output, Employment and Taxes represent total of Direct, Indirect, and Induced impacts.
2. In each management area, visitation associated with the proposed CHD is determined to be a percentage of the total visitation to the management area. These percentages are calculated as the ratio of acreage in the proposed CHD portion of each management area to the total acreage in that management area. To the extent that visitation is lower in the proposed CHD than the other portions of the ISDRA management areas, these are overestimates.
3. Upper and lower bound estimates reflect two visitation growth rate scenarios based on BLM analysis (BLM, 2003b), and two estimates of trip expenditures based on a number of sources: California Department of State Parks and Recreation, American Sand Association, and other OHV groups representing ISDRA recreation, including the Off-Road Business Association.

Exhibit B-4

REGIONAL ECONOMIC CONTRIBUTION FROM OHV-USE, YEAR 2013
ISDRA Management Areas
Imperial and Yuma Counties
(2003 dollars)

Management Area	IMPLAN Results	Total Impact Assuming Low Visitation		Total Impact Assuming High Visitation	
		Low Estimate (\$265 per trip)	High Estimate (\$515 per trip)	Low Estimate (\$265 per trip)	High Estimate (\$515 per trip)
Adaptive Management Area	Output	\$27,885,832	\$54,157,284	\$32,201,354	\$62,538,493
	Employment	611	1,132	705	1,308
	Taxes	\$1,821,798	\$3,569,751	\$2,103,734	\$4,122,194
Buttercup Valley	Output	\$28,625,813	\$55,594,408	\$33,055,853	\$64,198,021
	Employment	627	1,162	724	1,342
	Taxes	\$1,870,141	\$3,664,478	\$2,159,559	\$4,231,58
Dune Buggy Flats	Output	\$23,942,583	\$46,499,070	\$27,647,861	\$53,695,118
	Employment	524	972	605	1,123
	Taxes	\$1,564,183	\$3,064,963	\$1,806,251	\$3,539,287
Gecko	Output	\$28,324,615	\$55,009,449	\$32,708,042	\$63,522,536
	Employment	620	1,150	716	1,328
	Taxes	\$1,850,464	\$3,625,921	\$2,136,836	\$4,187,056
Glamis	Output	\$72,088,076	\$140,002,796	\$83,244,197	\$161,669,182
	Employment	1,579	2,928	1,823	3,381
	Taxes	\$4,709,557	\$9,228,215	\$5,438,393	\$10,656,344
Mammoth	Output	\$63,971	\$124,239	\$73,871	\$143,466
	Employment	1	3	2	3
	Taxes	\$4,179	\$8,189	\$4,826	\$9,456
North Algodones Wilderness	Output	\$0	\$0	\$0	\$0
	Employment	0	0	0	0
	Taxes	\$0	\$0	\$0	\$0
Ogilby	Output	\$4,974,655	\$9,661,315	\$5,744,517	\$11,156,470
	Employment	109	202	126	233
	Taxes	\$324,997	\$636,821	\$375,293	\$735,373

Note:

1. Output, Employment and Taxes represent total of Direct, Indirect, and Induced impacts.
2. Upper and lower bound estimates reflect two visitation growth rate scenarios based on BLM analysis (BLM, 2003b), and two estimates of trip expenditures based on a number of sources: California Department of State Parks and Recreation, American Sand Association, and other OHV groups representing ISDRA recreation, including the Off-Road Business Association.

Appendix C

ADDITIONAL CONSUMER SURPLUS RESULTS Three Percent Discount Rate

Exhibits C-1 through C-3 present the detailed past and potential future consumer surplus results using a three percent discount rate.

- Exhibit C-1 presents the economic efficiency effects associated with management efforts having past impacts. The bulk of these effects are consumer surplus losses associated with reduced OHV opportunities. The analysis assumes that past management actions to protect the PMV resulted in a 15 percent decline in total OHV trips taken, at the upper bound, from 1998 to 2004.
- Exhibit C-2 presents consumer surplus contributions of the proposed critical habitat areas, while Exhibit C-3 presents total consumer surplus contributions for all ISDRA management areas. To estimate these contributions, this analysis estimates visitation for the proposed CHD portion of each management area to be a percentage of total visitation for each management area. These percentages are calculated as the ratio of acreage in the proposed CHD portion of each management area to the total acreage in that management area. Lower and upper bound estimates reflect two visitation growth rate scenarios (i.e., annual growth rates of 3.5 percent and 5.0 percent) beginning in 2005 and continuing until the year 2013 based on BLM analysis (BLM, 2003b). Information beyond the ten year period is not available, and this analysis assumes visitation to remain at the 2013 levels into the future.

Exhibit C-1 PAST EFFICIENCY EFFECTS ASSOCIATED WITH LISTING AND OTHER PROTECTIVE MEASURES: 1998 - 2004 (millions of 2003 dollars, 3% discount rate)*			
Consumer Surplus (Reduced OHV opportunities) (2003 Dollars)	Administrative Costs	Project Modification Costs	TOTAL
\$19.94	\$1.04	\$3.01	\$23.99
Annualized (1998-2004):			\$4.00

Exhibit C-2 UPPER AND LOWER BOUND CONSUMER SURPLUS CONTRIBUTIONS FROM OHV-USE* Proposed CHD Management Areas 2004 - 2024 (Millions of 2003 dollars, 3 percent discount rate)		
Management Area	Lower Bound Present Value (Annualized Value)	Upper Bound Present Value (Annualized Value)
Adaptive Management Area	\$46.29 (\$2.31)	\$52.02 (\$2.60)
Buttercup Valley	\$27.80 (\$1.39)	\$31.24 (\$1.56)
Dune Buggy Flats	\$0.00 (\$0.00)	\$0.00 (\$0.00)
Gecko	\$53.49 (\$2.67)	\$60.12 (\$3.01)
Glamis	\$130.60 (\$6.53)	\$146.77 (\$7.34)
Mammoth	\$0.20 (\$0.01)	\$0.22 (\$0.01)
North Algodones Wilderness	\$0.00 (\$0.00)	\$0.00 (\$0.00)
Ogilby	\$5.88 (\$0.29)	\$6.61 (\$0.33)
<p>* In each management area, visitation associated with the proposed CHD is determined to be a percentage of the total visitation to the management area. These percentages are calculated as the ratio of acreage in the proposed CHD portion of each management area to the total acreage in that management area. To the extent that visitation is lower in the proposed CHD than the other portions of the ISDRA management areas, these are overestimates.</p>		

Exhibit C-3 UPPER AND LOWER BOUND CONSUMER SURPLUS CONTRIBUTIONS FROM OHV-USE* ISDRA Management Areas 2004 - 2024 (Millions of 2003 dollars, 3 percent discount rate)		
Management Area	Lower Bound Present Value (Annualized Value)	Upper Bound Present Value (Annualized Value)
Adaptive Management Area	\$133.66 (\$6.68)	\$150.21 (\$7.51)
Buttercup Valley	\$137.21 (\$6.86)	\$154.20 (\$7.71)
Dune Buggy Flats	\$114.76 (\$5.74)	\$128.97 (\$6.45)
Gecko	\$135.76 (\$6.79)	\$152.57 (\$7.63)
Glamis	\$345.52 (\$17.28)	\$388.31 (\$19.42)
Mammoth	\$0.31 (\$0.02)	\$0.34 (\$0.02)
North Algodones Wilderness	\$0.00 (\$0.00)	\$0.00 (\$0.00)
Ogilby	\$23.84 (\$1.19)	\$26.80 (\$1.34)
*Upper and lower bound estimates reflect two visitation growth rate scenarios based on BLM analysis (BLM, 2003b).		